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[COMMITTEE PRINT NO. 13]

THE CONTRIBUTION OF THE ALL-AMERICAN CANAL SYSTEM, BOULDER CANYON PROJECT, TO THE ECONOMIC DEVELOPMENT OF THE IMPERIAL AND COACHELLA VALLEYS, CALIF., AND TO THE NATION

UNIVERSITY OF MICHIGAN
MAR 1957
MAIN READING ROOM

REPORT

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BUREAU OF RECLAMATION
UNITED STATES DEPARTMENT OF THE INTERIOR

FOR THE USE OF THE

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS
HOUSE OF REPRESENTATIVES

MAY 1956

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STATEMENT OF THE CHAIRMAN

MAY 1956.

To the Members of the House Interior and Insular Affairs Committee.

This is another in the series of documents prepared at my request by the Bureau of Reclamation, showing the contribution of Reclamatoin projects to the economy of the project areas, and to the Nation.

We are all familiar with the requirements that Reclamation projects must be repaid and that benefits must exceed the costs, but little is said of the intangible effects—such as the new wealth created and the increased economic strength of the Nation. The objective of this series of studies is to develop more specific information on such intangible effects.

This particular document relates to the All-American Canal system, which is a part of the Boulder Canyon project. Briefly, the All-American Canal system includes Imperial Dam, on the Colorado River, about 18 miles northeast of Yuma, Ariz., a system of main canals to the Imperial and Coachella Valleys, and a distribution system to serve the Coachella Valley. Irrigation water through this system was supplied to the Imperial Valley in 1940, and to the Coachella Valley in 1947.

Among other things, the study shows that the value of crops and livestock produced in the Imperial Valley has increased by almost five times since operation of the All-American Canal was started, and agricultural production in railroad-carlot equivalents has more than doubled.

Since project operation started, the assessed valuation of Imperial County has about doubled, and the value of retail trade in the Imperial Valley has increased more than four times.

In the Coachella Valley, the value of crops and livestock produced has doubled in the few years since the Coachella Canal was placed in operation in the latter part of 1947, while the assessed valuation of the Coachella Valley County Water District, which encompasses the service area, has increased by three and a half times. Desert land in the Coachella Valley, which was valued at about $30 an acre prior to the development, is now valued at about $500 per acre.

Fruit and vegetables equivalent to over 42,000 railroad carloads were produced in the Imperial and Coachella Valleys in 1954 with shipments to most of the 48 States and Canada; a large portion of these important foods was shipped during the winter months to supply the off-season demand.

In these two valleys the increase in population, car and truck registration, building permits, postal receipts, and other economic indicators reflect the beneficial effect of an assured water supply through the facilities of the All-American Canal system.

I believe you will find this a very interesting study and another example showing that expenditures for our Reclamation program constitute one of the Nation's wisest investments.

CLAIR ENGLE,
Chairman, Interior and Insular Affairs Committee.

LETTER OF TRANSMITTAL

DEPARTMENT OF THE INTERIOR,
BUREAU OF RECLAMATION,
Washington 25, D. C., February 15, 1956.

Hon. CLAIR ENGLE,
Chairman, Interior and Insular Affairs Committee,
House of Representatives, Washington 25, D. C.

MY DEAR MR. ENGLE: Responsive to your request that this Bureau submit information describing accomplishments of specific Reclamation projects, we are pleased to transmit herewith two copies of an additional report recently completed, entitled "Report on Contributions of the All-American Canal System, Boulder Canyon Project, to the Economic Development of the Imperial and Coachella Valleys, Calif., and to the Nation."

Briefly, the All-American Canal system includes Imperial Dam and desilting works on the Colorado River about 18 miles northeast of Yuma, Ariz., a system of main canals to the Imperial and Coachella Valleys, Calif., and an underground distribution system to serve about 75,000 acres in the Coachella Valley. Irrigation water through this system was first supplied to the Imperial Valley in 1940, and to the Coachella Valley in the latter part of 1947.

Some of the highlights of the report are as follows:

1. Imperial Valley

A. The value of crops and livestock produced increased from $26.7 million in 1940 to $129.6 million in 1954, or by 4.8 times. During this same period the index of prices received by farmers increased only 2.4 times.

B. Total agricultural production in railroad-carlot equivalents increased from 53,000 in 1940 to 109,000 in 1954.

C. Acreage irrigated increased by 38,000 acres from 414,000 acres in 1940 to 452,000 acres in 1954.

D. Production of electric power from hydroelectric plants constructed and under construction on the All-American Canal would require consumption of about one-half million barrels of fuel oil annually if this power had to be produced from oil-fired steam plants.

E. The assessed valuation of Imperial County increased from $36,176,000 in 1940 to $72,612,000 in 1954.

F. The volume of retail trade in the Imperial Valley increased from $23.7 million in 1939 to $104.3 million in 1953.

G. In 1954, nearly $2,300,000 was collected as a result of the California State retail-sales-tax levy, and the property-tax levy produced nearly $5,000,000.

H. Fruit and vegetables equivalent to over 42,000 railroad carloads were produced in the Imperial and Coachella Valleys in

1954, with shipments to almost all the 48 States and Canada. A large portion of these important foods was shipped during the winter months to supply the off-season demand.

I. Increase in population, car and truck registration, building permits, postal receipts, and other economic indicators reflect the beneficial effect of an assured water supply through the facilities of the All-American Canal system.

2. Coachella Valley

A. The value of crops and livestock produced increased from $13.1 million in 1947 to $25.3 million in 1954, or by 1.9 times.

B. Agricultural production in railroad-carlot equivalents increased from 8,420 carloads in 1946 to over 14,000 carloads in 1954. The acreage irrigated has increased from about 20,000 acres in 1946 to more than 50,000 acres in 1954.

C. The assessed valuation of the Coachella Valley County Water District which encompasses the service area has increased from $12.9 million in 1947 to $42.7 million in 1954.

D. Prior to the availability of Colorado River water, good quality raw desert land in the Coachella Valley could be purchased for about $30 per acre. In 1955 these same lands, developed for irrigation of field crops, were valued at about $500 per acre, an increased valuation of about $14 million for the 30,000 acres of new lands irrigated.

E. Similarly with the Imperial Valley, but to a much higher degree, the various economic indicators such as population increase, postal receipts, utility connections, building permits, and bank resources reveal the tremendous economic growth of the area since water became available through the facilities of the All-American Canal system.

Any comments or suggestions you may have regarding the attached report will be appreciated.

Sincerely yours,

E. G. NIELSEN,
Acting Commissioner.

CONTRIBUTION OF THE ALL-AMERICAN CANAL SYSTEM, BOULDER CANYON PROJECT, TO THE ECONOMIC DEVELOPMENT OF THE IMPERIAL AND COACHELLA VALLEYS, CALIF., AND TO THE NATION

UNITED STATES DEPARTMENT OF THE INTERIOR
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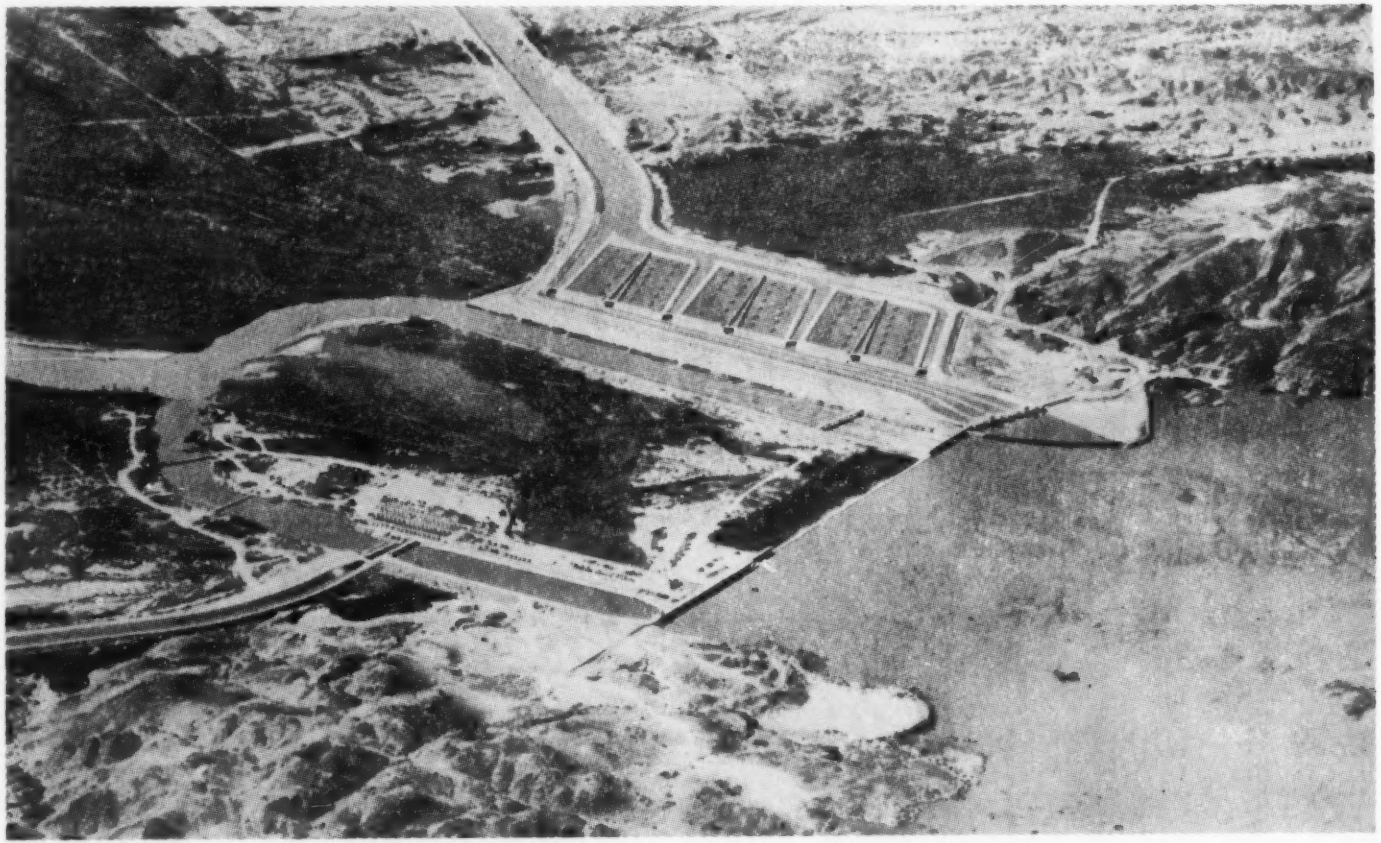
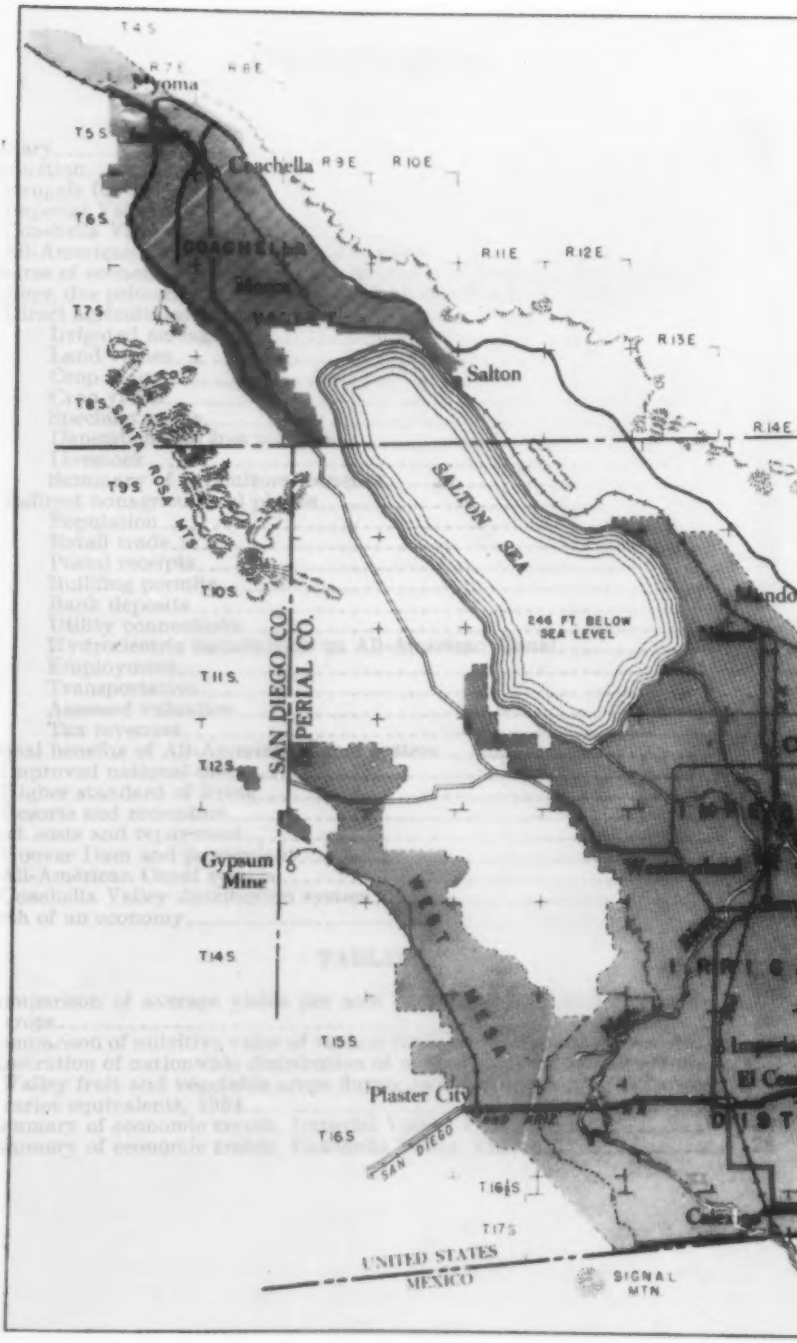


Aerial view of Imperial Dam and Desilting Works on Colorado River.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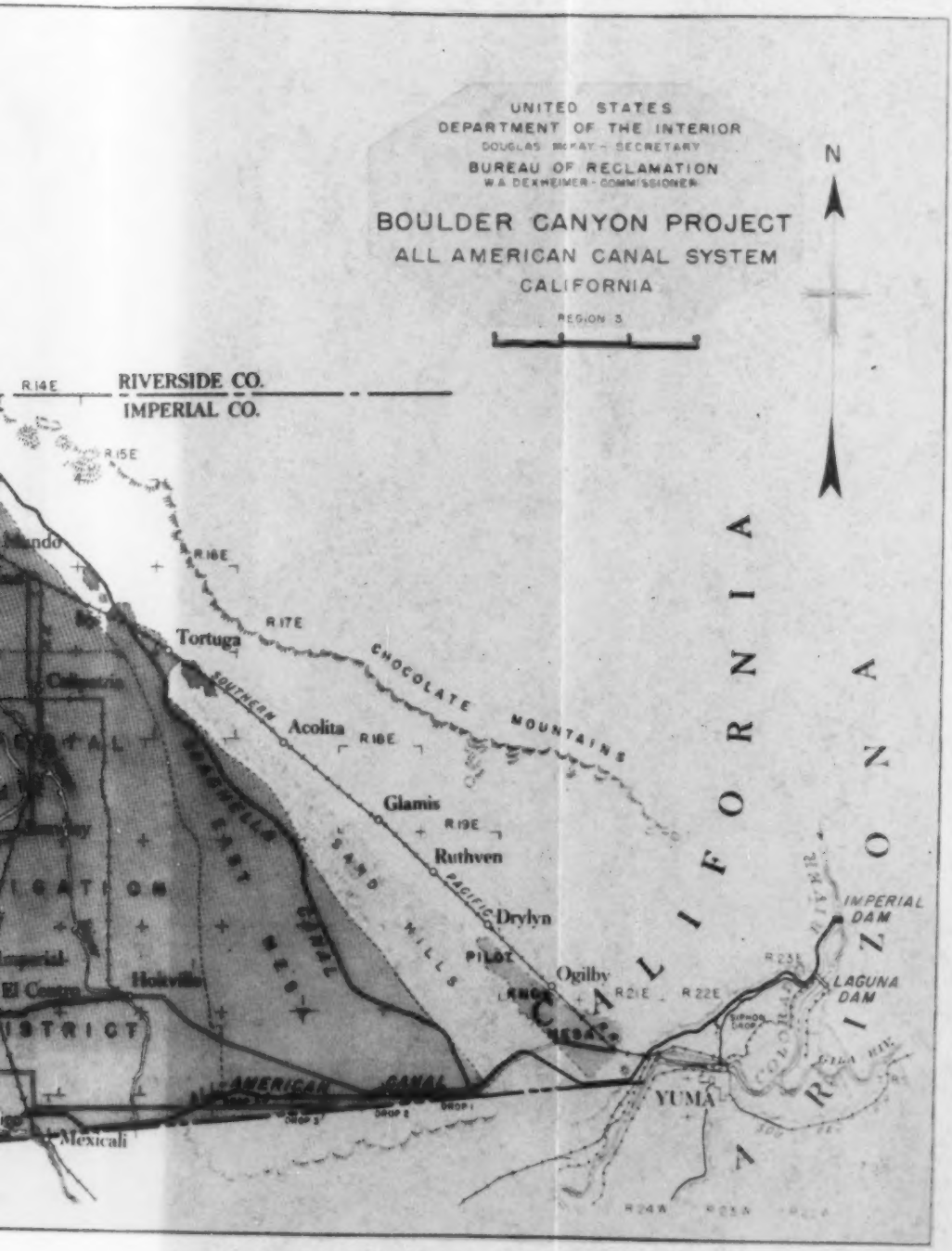
UNITED STATES
DEPARTMENT OF THE INTERIOR
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BUREAU OF RECLAMATION
W.A. DEXHEIMER - COMMISSIONER
BOULDER CANYON PROJECT
ALL AMERICAN CANAL SYSTEM
CALIFORNIA
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IMPERIAL CO.
R15E
R16E
R17E
Tortuga
CHOCOLATE MOUNTAINS
SOUTHERN PACIFIC
Acolita
R18E
Glamis
R19E
Ruthven
SAND HILLS
PACIFIC
Drylyn
PILOT KNOB
Ogilby
R21E
R22E
R23E
IMPERIAL DAM
LAGUNA DAM
YUMA
COLORADO RIVER
GILA RIV.
CALIFORNIA
ARIZONA
ALL AMERICAN CANAL
DROP 3
DROP 2
DROP 1
Mexicali
Holtville
El Centro
R24E
R25E

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SUMMARY

On October 12, 1940, water was turned into the East Highline Canal of the Imperial Irrigation District, permitting for the first time the irrigation of more than 400,000 acres of land in Imperial Valley of California through a canal system constructed entirely in the United States. The labors of a quarter of a century, leading up to enactment of the Boulder Canyon Project Act on December 21, 1928, and construction of the All-American Canal, bore fruit in the completion of the All-American Canal to the Imperial Valley, relieving one of the largest and most productive agricultural areas in the United States from the uncertainty of water delivery through a canal system constructed on foreign soil.

The All-American Canal system, which includes Imperial Dam and desilting works located on the Colorado River about 18 miles northeast of Yuma, Ariz., the main All-American Canal extending westward for 80 miles to serve the Imperial Valley, the 123-mile Coachella Main Canal, and the distribution system serving the Coachelal Valley, was constructed under the authority of the Boulder Canyon Project Act. Lands of the Imperial Valley previously were irrigated through a main canal extending from the Colorado River but running for the most part through the Republic of Mexico. However, the erratic flow of the river, together with difficulties occasioned by maintenance of canal facilities running through a foreign country, and shortages of irrigation water, seriously impaired full economic development of the area.

With an assured water supply, increase in production of farm crops in the Imperial Valley has been phenomenal. Field crops valued at only $5,321,000 in 1940 had increased to $65 million by 1954, or by 1,122 percent. Vegetable and truck crop values increased from less than $13 million to $34 million, or by 167 percent. Production of livestock and livestock products was up by 274 percent, all from an agricultural area which had expanded by only 9 percent in 14 years, reflecting a significant and very substantial increase in actual per acre productivity. Crop values per cultivated acre increased correspondingly from an average of $53.50 in 1940 to $200 in 1954.

Other measures of economic growth in Imperial Valley were equally significant. Assessed valuation of property increased from $36,176,000 in 1940 to $72,612,000 in 1954. Bank deposits were upped by 486 percent from $9,400,000 to slightly over $55 million. Truck registrations were up by 221 percent, retail sales rose by 322 percent, postal receipts by 182 percent, number of telephones in service by 175 percent from 5,865 to 16,127, and individual incomes of civilian residents were reported by the California State Chamber of Commerce to have increased between the years 1940 and 1952 from $30 million to $136 million.

Growth of the Coachella Valley north of the Salton Sea, which began receiving irrigation water through the All-American Canal from the Colorado River in the latter part of 1947, has been equally impressive. Irrigated acreage which increased slowly from 16,350 in 1940 to 19,725 in 1947 had by 1954 expanded to 50,446 acres, with the 30,000-acre

increase during the 7 years following 1947 directly attributable to the availability of an adequate supply of gravity irrigation water. Per acre crop income between 1940 and 1954 increased from $154 to $480 per acre. During the same period total gross crop income increased from $2,500,000 to about $24,600,000. The productive soils of the Coachella Valley combined with an excellent climate have long been noted for production of off-season fruits and vegetables coming on the market during the winter season when shipments for some other areas are either nonexistent or at a minimum.

The Nation's domestic date gardens are concentrated primarily in the Coachella Valley, with 90 percent of this country's production originating here. Dates, together with desert grapefruit and other tree and vine crops, mature slowly but the value of this production has increased by nearly $4 million between 1946 and 1954, with reported income in 1954 of $12,200,000. Field crops which were not included widely in the rotation prior to the availability of Colorado River water increased in value in 8 years by in excess of 900 percent to $3,800,000. The rise in value of raw desert land from roughly $25 per acre in 1940 to an estimated $250 in 1954 is indicative of the values with the magic touch of irrigation where the application of water can bring a crop income of $500 per acre from land otherwise unproductive and worthless even for grazing.

The assessed valuation of property in the Coachella Valley County Water District increased from $12,856,000 in 1947 to about $42,700,000 in 1954. Bank resources of the Coachella Valley increased by 107 percent, postal receipts by 470 percent, telephones in service by 216 percent, and valley school enrollment rose from 1,929 in 1940 to 5,060 in 1954. Again, the long list of economic indicators point impressively to the values created by the availability of irrigation water and to the economic importance of reclamation in an area so arid that without water there is nothing, and with it a rich agricultural area is created which supplies millions of dollars worth of agricultural crops at one time considered luxuries, but now accepted as a commonplace part of the American diet.

All of this increased activity at the local level has in turn influenced the economy of the rest of the Nation. In addition to the thousands of carloads of agricultural commodities shipped out of the Imperial and Coachella Valleys to all parts of the United States and Canada, the major railroads serving the valleys reported that in 1954 over 20,000 carloads of goods originating throughout the Nation were shipped into the area. This is exclusive of the very substantial volume of truck shipments. The thousands of economic opportunities to earn a livelihood created by construction of the All-American Canal system are by no means limited to the local level. Such opportunities extend to many fields of endeavor throughout the Nation, ranging from salad dressing manufacturing to smelting iron. In addition to strictly economic opportunities, development and settlement of the Salton Basin makes more accessible to the thousands of tourists the many scenic and geologic wonders that are present in this combination "inland sea-desert-mountain-winter-garden area" of the United States.

The All-American Canal system constructed under the Boulder Canyon Project Act has contributed substantially to the growth of our Nation. Far into the future it will remain as a solid and stable foundation on which this economic growth can be continued.

THE CONTRIBUTION OF THE ALL-AMERICAN CANAL SYSTEM, BOULDER DAM PROJECT, TO THE ECONOMIC DEVELOPMENT OF THE IMPERIAL AND COACHELLA VALLEYS, CALIF., AND TO THE NATION

INTRODUCTION

The Imperial Valley in Imperial County and the Coachella Valley in Riverside County, Calif., lie in what is generally known as the Salton Basin, which is about 110 miles long and 40 miles wide. In ancient times the Salton Basin was an arm of the Gulf of California but was cut off from the ocean by the Colorado River as it built its delta. Practically the entire basin is below sea level, with the Salton Sea covering an area of about 215,000 acres in the lower portion of the valley. The Imperial Valley abuts the Mexican border on the south and the Salton Sea on the north. The Coachella Valley occupies the northern narrow end of the Salton Basin lying between the San Bernardino Mountains to the north and west and the northern boundary of the Salton Sea on the south.

The winters are short and mild, and severe killing frosts seldom occur. Year-round agriculture is possible and a frost-free growing season of about 300 days annually normally can be expected. The relative humidity of the atmosphere is low during the greatest part of the year. Rains are irregular in occurrence with the annual average rainfall being between 2 and 3 inches. The rains are seldom beneficial and are occasionally detrimental to crops. Because of the extremely arid climatic conditions in the area, no dry-land farming is practicable. The soils are exceptionally fertile and the topography of both the Imperial and Coachella Valleys is well fitted to irrigation farming, with a gradual slope generally toward the Salton Sea which permits the distribution of irrigation water without undue difficulty.

According to nature the valleys are strictly desert but, according to man, by putting engineering and agricultural know-how to work, the Imperial and Coachella Valleys have been transformed into one of the Nation's most amazing winter-garden areas.

THE STRUGGLE FOR DEVELOPMENT

Imperial Valley

Although the idea of bringing water from the Colorado River to the arid lands in the valley was conceived as early as 1849, the history of the modern Imperial Valley begins in 1892 with the efforts of Engineer Charles R. Rockwood to bring Colorado River water to the valley through a canal running through Mexico. The original canal from the Colorado River headed at Hanlon's Crossing in California about 500 feet north of the Mexican border. The canal crossed the border and extended along the Alamo River Channel through Mexico

for nearly 60 miles where it was turned back into the United States for use in Imperial Valley. By the spring of 1902, nearly 400 miles of distribution canals had been built to serve approximately 100,000 acres of valley lands.

By 1904, two factors combined to result in a decision to abandon the original heading for the Alamo Canal in favor of an alternative diversion several miles downstream in Mexican territory. These factors were the difficulty encountered in establishing a secure water right from the United States, and a tendency of the upper portion of the Alamo Canal to become clogged with sediment. The license granted by the Mexican Government for the alternative diversion site was premised upon several rather severe conditions, among which was the requirement that up to one-half of all water diverted might be used for irrigation of lands in Mexico. As a result of this agreement, there were periods of shortage in the Colorado River when American farmers were forced to decrease the irrigation of their lands so that Mexican lands could be irrigated.

In the spring of 1905 an unprecedented flood destroyed the Mexican heading and control of the river was lost. Before necessary repairs could be made, the entire flow of the Colorado River began pouring into the Alamo River and thence to the Salton Sea. This flow of the Colorado River to the Salton Sea continued for almost 2 years, raising its surface to 195 feet below sea level and extending its area to some 330,000 acres. It was only with the financial backing of the Southern Pacific Railroad that the break finally was closed in 1907.

The fact that the Colorado River was turned back into its channel after the disastrous 1905–07 flood did not end the struggle. Danger from recurring floods, the continually rising demand for water, and constant difficulties encountered in diverting from the river and maintaining the Alamo Canal created what at times seemed like insurmountable problems. In addition, the American farmers did not believe that the Mexican farmers were paying a just proportion of the cost of operating the canal. Tempers were raised during periods of flood danger when flood control work was impeded by the requirement for paying duties on equipment and supplies sent across the border, and the requirement that a large amount of rather inefficient foreign labor be utilized in the work. The foregoing, together with the fact that American farmers often had to decrease irrigation of their lands due to shortage of river flow, began to crystalize into definite action the agitation for an All-American Canal.

Coachella Valley

The water supply for initial development of the Coachella Valley came from the high mountains down the Whitewater River and its tributaries and sank into the underground water basin. Although artesian water was discovered in the Coachella Valley in 1894, early well-drilling methods were so expensive that no substantial development took place until after 1900, when the first hydraulic well was put down near the center of the valley at a comparatively reasonable cost. Within the next 3 years 200 wells were established and by 1907 there were about 400 wells in the basin, some 250 to 300 of which were artesian. By 1913 approximately 4,000 acres were under cultivation in the Coachella Valley.

As more land was brought into production it was realized that the annual withdrawals from the artesian basin were greater than the

annual replenishments, and the valley farmers recognized that the life-giving waters stored beneath the desert sands would support only a limited agriculture. To realize the valley's full promise of agricultural prosperity, supplemental water had to be found. The only foreseeable solution to this problem was the building of a branch canal from the proposed main All-American Canal to the Imperial Valley, which would circle the rim of the Coachella Valley area.

THE ALL-AMERICAN CANAL—LIFELINE IN THE DESERT

The Imperial Valley was not the only district in the lower Colorado region that suffered from Colorado River floods. Farmlands had been inundated, crops lost, level lands gullied, irrigation systems ruined, farm buildings and equipment destroyed, cities and homes damaged, and lives lost in several areas along the lower river. Without control of floods on the river, the communities of the lower Colorado could not continue to meet such losses and some of the most valuable irrigation development in the lower basin would have to be abandoned, or could not be developed at all.

On May 18, 1920, the Kinkaid Act was passed, directing the Secretary of the Interior to make an examination of the Imperial Valley and to report on its condition and possible irrigation development. A detailed investigation was made and the formal report was submitted to Congress on February 28, 1922. The recommendations of the report presented in definite form the chief aspects of the Boulder Canyon project, and most of the recommendations were incorporated in the various Swing-Johnson bills authored by Congressman Phil D. Swing and Senator Hiram Johnson, both of California. The first three of the Swing-Johnson bills introduced in Congress were defeated but the fourth and last introduced on December 5, 1927, became the Boulder Canyon Project Act and was signed by the President on December 21, 1928. Thus, the local problem of the diversion of water from the Colorado River to the Imperial Valley over a route entirely within the United States had developed into a project of interstate and international aspects and included water storage, flood control, river regulation, and power development.

In addition to the construction of Hoover Dam, which was substantially complete in 1935, the Secretary of the Interior was authorized to construct a main canal and appurtenant structures located entirely within the United States, connecting Laguna Dam or other suitable diversion dam which the Secretary was authorized to construct if necessary, with the Imperial and Coachella Valleys in California.

The main All-American Canal is one of the largest irrigation canals in the United States. The main canal is 80 miles long extending southwesterly from Imperial Dam about 5 miles above Laguna Dam for about 20 miles and turning westward just north of the Mexican border through shifting sand dunes and desert mesa to and across the Imperial Valley. The 123-mile canal to the Coachella Valley branches off from the All-American Canal about 20 miles west of Yuma and follows a northwesterly course across the desert east and north of Imperial Valley.

Since the normal water surface elevation at Imperial Dam is 179.5 feet above sea level and the Imperial and Coachella Valley lands are

largely below sea level, considerable potential existed on the All-American Canal for the development of power. This power potential is being developed by the Imperial Irrigation District and at the present time powerplants are installed at drops 2, 3, and 4 of the All-American Canal, with construction underway on another powerplant at Pilot Knob.

In addition, the All-American Canal may be used for the delivery of water to Mexico in accordance with the provisions of the treaty with Mexico dated February 3, 1944. The All-American Canal was declared to be complete and those works not previously transferred to Imperial and Coachella Districts turned over to Imperial Irrigation District on May 1, 1952. Imperial Dam was retained for operation by the United States in accordance with a supplemental contract between the United States and Imperial Irrigation District dated March 4, 1952, designed to fulfill requirements of the treaty with Mexico as it applies to water delivery in that country from the Colorado River.

MEASURES OF ECONOMIC GROWTH AND DEVELOPMENT OF IMPERIAL AND COACHELLA VALLEYS, DUE PRIMARILY TO CONSTRUCTION OF ALL-AMERICAN CANAL SYSTEM

Direct agricultural phases

Irrigated acreage.—The major portion of the acreage in the Imperial Valley proper had been developed prior to construction of the All-American Canal system. Although the All-American Canal was built to provide a more dependable and less costly method of transporting Colorado River water to the Imperial Valley, additional acres could be brought under cultivation due to the higher elevation of the water surface of the All-American Canal over the old Alamo Canal which entered the valley through Mexico. At the time water deliveries to the Imperial Valley through the All-American Canal system first began on October 12, 1940, the irrigated acreage in the valley was fairly stable with the average acreage irrigated approximating 414,000 acres. In 1954 the irrigated acreage of the valley was approximately 452,000, an increase of 38,000 acres, development of which might be attributed largely to the assured water supply through the All-American Canal. The dependability of the water supply has also resulted in a more constant acreage devoted to intensive high risk crops which could not be undertaken without a dependable water supply.

In the Coachella Valley, the acreage irrigated from the underground water supply was fairly well stabilized at about 20,000 acres prior to completion of the All-American Canal to the Coachella Valley. However, with this acreage there was a considerable overdraft in the underground basin. In 1954 the acreage irrigated in the Coachella Valley had increased to over 50,000, and Colorado River water is available to an additional 25,000 acres which have not yet been subjugated. All-American Canal water was first delivered to Coachella Valley lands on an emergency basis during the latter part of 1947, with permanent deliveries beginning in 1948. It is estimated that in both the Imperial and Coachella Valleys over 100,000 additional acres can be irrigated since construction of the All-American Canal system, as compared with the acreage which could receive water prior to that date. This

is exclusive of any acreage that might later be developed on Imperial's West or Pilot Knob Mesas. Based on 1954 crop values, this additional acreage could produce annual crops valued in excess of $20 million.

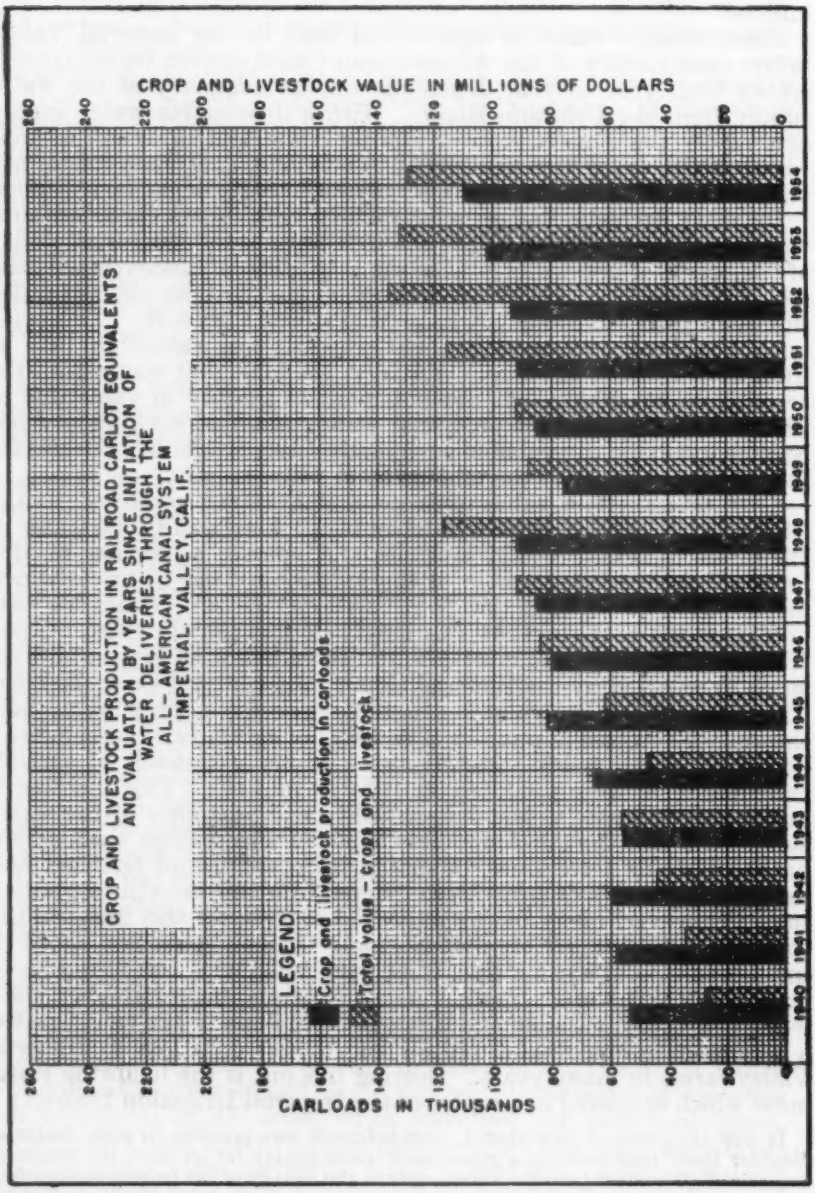
Land values.—Value of agricultural land in the Imperial Valley before construction of the All-American Canal system varied considerably from year to year depending on the adequacy of the water supply from the Colorado River. With a dependable water supply assured by the construction of Hoover Dam and diversion of that water to the valley through the All-American Canal, land values not only have stabilized but are higher than otherwise might be expected.

In the Coachella Valley good quality raw desert land, without water, could be purchased from $25 to $35 per acre before availability of Colorado River water. The same quality of undeveloped raw desert land under the distribution system and with an assured water supply in 1955 was valued at from $225 to $300 per acre. This same quality of land developed for field crop use was valued in 1955 at from $400 to $600 per acre. Actually, the land that was within the artesian water supply belt did not increase sharply in value due to availability of All-American Canal water, but had such supply not become available the value of such lands surely would have decreased due to the depletion of the underground water supply.

Crop values.—The value of crops and livestock produced in the Imperial Valley since the availability of All-American Canal water in 1940 has increased nearly fivefold. Of course, a portion of this increase may be attributable to the inflationary rise in prices which has occurred during that time, but based on constant dollars the crop and livestock value in 1954 was nearly double that in 1940. Chart No. 1 shows clearly the growth in dollar valuation of crops and livestock as reported by the Imperial County Agricultural Commissioner. The growth in dollar valuation is buttressed by accompanying bars showing the growth in number of carloads of agricultural commodities produced in the valley. Nearly twice as many carloads of agricultural products were produced in 1954 as in 1940. This increase is attributable in part to the dependability and adequacy of the water supply through the All-American Canal. Other factors such as improved farming techniques, including increased use of fertilizer and improved varieties of crops have entered into this growth in production. However, many of the improved techniques also increase the cost of production per acre which many farmers could not afford to undertake if at the same time they were faced with the prospects of an intermittent water supply. As an example, before Hoover Dam was constructed, variable and unpredictable flows in the river created a serious situation responsible for substantial crop loss to Imperial Valley farms in many years. Bearing this out is the following statement which appeared in a report of the Imperial Irrigation District:

> It was the irony of fate that 1 year before it was possible to store water at Boulder Dam, thus creating a guaranteed water supply for all time, the people of Imperial Valley should see the lowest river in the history of the present generation. During the summer of 1934 the most disastrous and greatest drougth in the history of the valley was experienced by the people of the District. These were probably the darkest days the Imperial Irrigation District ever experienced and which we are sure will never occur again.

CHART 1


CROP AND LIVESTOCK VALUE IN MILLIONS OF DOLLARS
260
240
220
200
180
160
140
120
100
80
60
40
20
0
CROP AND LIVESTOCK PRODUCTION IN RAILROAD CARLOT EQUIVALENTS
AND VALUATION BY YEARS SINCE INITIATION OF
WATER DELIVERIES THROUGH THE
ALL-AMERICAN CANAL SYSTEM
IMPERIAL VALLEY, CALIF.
LEGEND
Crop and livestock production in carloads
Total value - crops and livestock
1939
1941
1942
1943
1944
1945
1946
1947
1948
1949
1950
1951
1952
1953
1954
CARLOADS IN THOUSANDS

Reiterating this statement to some degree in a later report, the Imperial Irrigation District stated as follows:

> During the summer of 1939 Boulder Dam again saved the valley from disastrous drought. In August flow of the Colorado River into the reservoir behind the dam averaged only 4,000 second feet daily. After deducting river losses by evaporation and diversions between the dam and Yuma not more than 2,000 feet would have remained to be turned into the district canal system. Stored water stood between us and water famine such as we suffered five years ago.

Low river flows have occurred again and again in the Colorado River since the construction of Hoover Dam, which could have resulted in serious drought damage to the Imperial Valley. These low flows were, of course, above the reservoir created by Hoover Dam, and did not affect the regular flow maintained below the dam which provided an adequate water supply to all water users in the lower Colorado region.

Acreage irrigated and crop values in the Coachella Valley have increased steadily since water deliveries to the valley were first commenced through the All-American Canal in the latter part of 1947. Chart No. 2 shows the growth in crop value each year as reported by the Riverside County Agricultural Commissioner, together with the increase in crop production measured in railroad carloads. Charts Nos. 1 and 2 provide indisputable evidence that the All-American Canal has been of tremendous benefit to the Imperial and Coachella Valleys and the rest of the Nation through the millions of dollars increase in crop production alone, even if no consideration were given to the many other benefits which have resulted from construction of the canal system.

Chart 3 shows the value per acre for several of the major crops harvested in the Imperial and Coachella Valleys in 1954.

Crop yields.—The deep rich soils of the Imperial and Coachella Valleys, combined with the favorable geographic location and a dependable water supply provided by the All-American Canal system make the area one of the richest agricultural empires in existence. Not only are the farmers able to produce 2 or 3 crops per year from the same land, but the yields obtained from many of the crops grown are considerably in excess of the average yield for the United States. For instance, the average flax yield per acre in Imperial Valley is 33.8 bushels per acre, which is approximately 4 times the United States average of 8.8 bushels per acre. In fact, the world's record yield of flax of some 70 bushels per acre has been established in the Imperial Valley. Table 1 gives a comparison of the average yields per acre of various field and vegetable crops in the Imperial-Coachella Valley area with that of the United States as a whole. Not only are many of the yields considerably greater, but the crops are harvested at a time when other agricultural areas of the United States are lying dormant. Many of the fruit and vegetable crops consumed fresh in the United States during the winter months are produced on the lands served by the All-American Canal system.

CHART 2

CROP VALUE IN THOUSANDS OF DOLLARS
26,000
24,000
22,000
20,000
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
1954
1953
1952
1951
1950
1949
1948
1947
CROP PRODUCTION IN RAILROAD CARLOT EQUIVALENTS AND CROP VALUATION BY YEARS SINCE INITIATION OF WATER DELIVERIES THROUGH THE ALL-AMERICAN CANAL SYSTEM COACHELLA VALLEY, CALIF.
LEGEND
Crop production in railroad carloads
Crop value dollars
RAILROAD CARLOADS

CHART 3

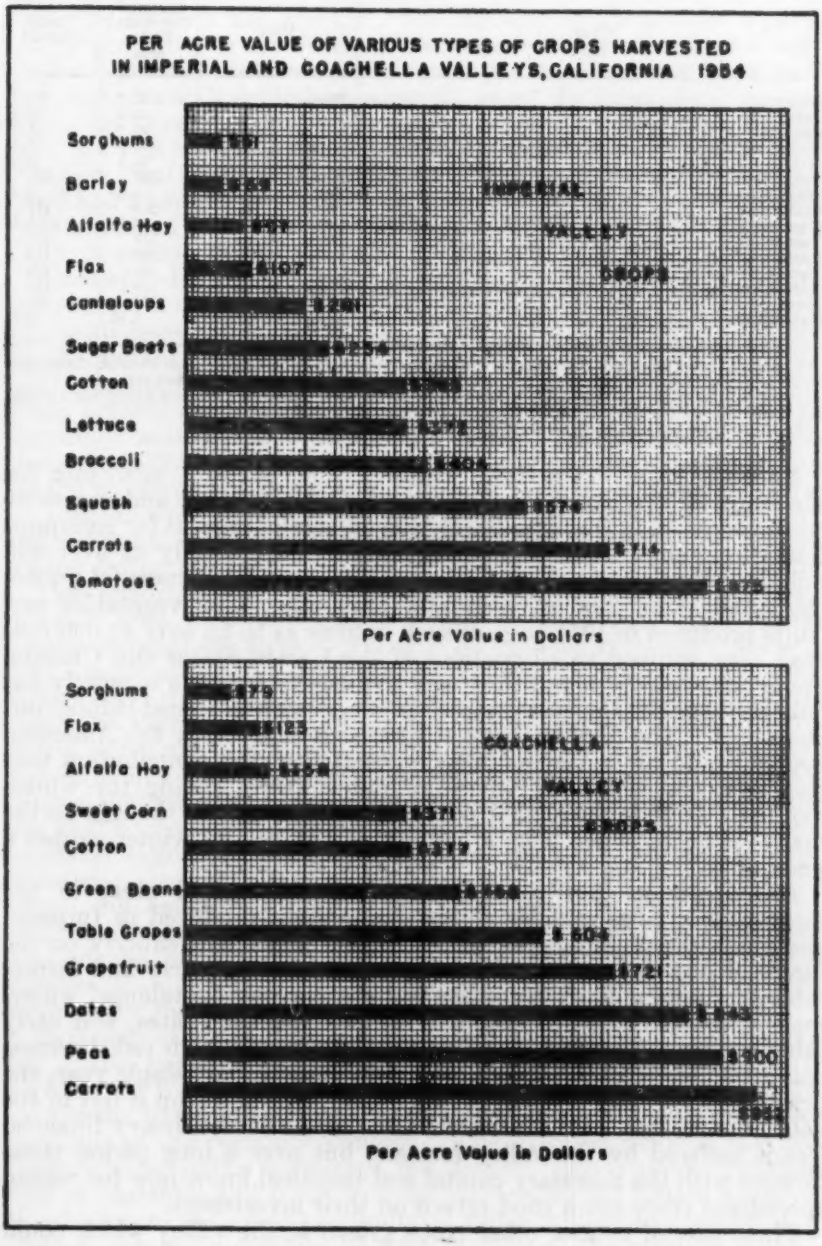

PER ACRE VALUE OF VARIOUS TYPES OF CROPS HARVESTED IN IMPERIAL AND COACHELLA VALLEYS, CALIFORNIA 1954
Sorghums
Barley
Alfalfa Hay
Flax
Canteloups
Sugar Beets
Cotton
Lettuce
Broccoli
Squash
Carrots
Tomatoes
IMPERIAL VALLEY CROPS
Per Acre Value in Dollars
Sorghums
Flax
Alfalfa Hay
Sweet Corn
Cotton
Green Beans
Table Grapes
Grapefruit
Dates
Peas
Carrots
COACHELLA VALLEY
Per Acre Value in Dollars

TABLE 1.—*Comparison of average yields per acre of various field and vegetable crops (3-year average for period 1951–53)*

Crop	Unit	Imperial-Coachella[1] Valley area	United States[2]
Barley	Bushel	45.7	27.5
Oats	do	45.0	33.3
Sorghum	do	31.7	17.7
Wheat, winter	do	40.0	18.6
Flax	do	33.8	8.8
Cotton lint	Pound	735	291
Alfalfa hay	Ton	[3] 5.0	2.2
Alfalfa seed	Pound	238	131
Sugar beets	Ton	17.9	15.6
Cantaloups	Crate	117	112
Tomatoes, fresh	Bushel	249	148
Carrots, winter	do	488	276
Lettuce, winter	Crate	179	173
Sweet corn	5 dozen ears	138	107
Watermelons	Ton	5.87	3.35

[1] Computed from Bureau of Reclamation crop census reports for Imperial Irrigation District, California, which represents approximately 90 percent of the Imperial-Coachella Valley irrigated area.
[2] Computed from U. S. Department of Agriculture Agricultural Statistics, 1953, and Agricultural Statistics, 1954.
[3] Includes 1 ton per acre equivalent utilized as winter pasture.

Specialty crops.—America's winter garden is not a misnomer for the Imperial and Coachella Valleys. In 1954 the fruit and vegetable crops produced in this area during the off-season months for consumption throughout the United States were valued locally at over $55 million. By the time these products reached the consumers, of course, the retail value was much greater than this. The vegetables and fruits produced in 1954 were of such volume as to fill over 42,000 railroad cars, shipped to all portions of the United States and Canada. Some undoubtedly found their way to overseas markets to supply not only civilians but the many American servicemen stationed throughout the world. The high nutritional standards enjoyed by the American people would be an impossibility without the vital contribution that this area makes to the American dinner tables during the winter months. It is doubtful that consumers give a second thought to the many struggles which were a prelude to making this winter garden a possibility.

Dependence on free markets.—Typical of irrigated areas in the southwest, a large number of the major crops produced in Imperial and Coachella Valleys enter a free market dependent entirely on the forces of demand and supply for establishment of prices and farmer returns. Among such crops are lettuce, carrots, cantaloups, watermelons, sweet corn, bell peppers, cabbage, squash, dates, and early table grapes. Growing these intensive crops is a high risk business and although substantial profits may be made in any single year, the price situation may be such in other years that the crop is left in the field unharvested. Of course when the latter occurs, heavy financial loss is suffered by the valley farmers, but over a long period those farmers with the necessary capital and technical know-how for raising specialized crops get a good return on their investment.

There are, of course, other crops grown in the valley which could come under the Federal Government's price-support program but which seldom are affected by it. Most of the feed grains, such as barley and grain sorghums produced in the valleys, are consumed

locally in the many cattle-feeding yards. The price-support program is seldom brought into play with these crops.

The nature of farming in the valley is such that rapid shifts can be made from one season to another to coordinate production with the economic needs of the country. For instance, if the price of a particular commodity is set by the Department of Agriculture at a sufficiently high level that it would be to the producer's advantage to grow this crop, the shift could be made with ease. In cases of this nature, where the price support programs are designed to encourage production, the expenditure by the Government could not be considered as a burden created by over production. The major portion of the livestock and livestock products of the area are consumed in the southern California area and therefore are not in competition for the consumer's dollar in eastern markets.

Livestock.—In recent years livestock has become of increasing importance in the Imperial and Coachella Valleys. This is particularly true with respect to cattle-feeding yards where livestock are finished for the market. In the Imperial Valley there are now 120 individual cattle-feeding lots with a capacity of 192,000 head. On January 1, 1955, 124,000 head of cattle were on feed. Lamb feeding is also an important industry in the Imperial Valley. On December 1, 1954, there were 332,000 head of sheep and lambs being fattened in California for the winter and early spring markets, and of this number 248,000 or 75 percent were in the Imperial Valley. Thousands of sheep and lambs normally are shipped from the Northern States to the Imperial Valley during the winter months for feeding and pasturing on alfalfa.

The importance of livestock in the Coachella Valley does not compare with that of the sister valley to the south. Most of the Coachella lands are utilized primarily for growing specialty crops with only a small percentage of the area devoted to field crops and livestock. However, cattle feeding is becoming a more important link in the Coachella Valley economy each year. A few years back cattle feeding in the valley was almost nonexistent, but today it is estimated to be a million and a half dollar business annually. Recent experience has proved that cattle can be fed the year round in the Coachella Valley and that scientifically designed shade, use of cool water, and feeding of balanced rations to obtain the greatest yield can provide a stable industry. One cattle-feeding yard has been established in the valley which can handle nearly 20,000 head of cattle at one time. This single feed yard employs about 25 men on a full-time basis. The closeness of the metropolitan market around the San Diego and Los Angeles areas makes the Imperial and Coachella Valleys an ideal location for the final feeding of livestock animals.

Summary of agricultural benefits.—The All-American Canal system has made possible the establishment of a continuing prosperous agricultural industry covering over half a million acres of irrigated land in the Imperial and Coachella Valleys, which in turn serves many segments of the Nation's economy. The irrigated lands in this area contribute not only a significant, but in some seasons almost the entire flow of vegetable and truck crop specialties into the Nation's market. In addition to the specific agricultural values which have been derived through construction of the All-American Canal, the irrigation districts themselves have profited substantially through a reduction in required

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maintenance costs of bringing water to the valley. A report of the Imperial Irrigation District issued in 1931 prior to construction of the All-American Canal system and completion of Hoover Dam stated:

> The district is at the present time required to pay and does pay approximately $500,000 a year for silt removal. That heavy burden will be eliminated with the construction of these works, * * * not counting the additional saving of the cost of silt control to the individual farmer.

The old Alamo Canal running through Mexico was a constant source of operating difficulty and, by having all the irrigation works in the United States, not only has the maintenance work become less but it has been easier to accomplish. In addition, adequate supplies of irrigation water have always been available since construction of Hoover Dam and its counterpart, the All-American Canal.

Indirect nonagricultural phases

Population.—For practical purposes Imperial County is synonymous with the Imperial Valley. With the exception of about 12,000 acres in the extreme southeastern corner of the county included in the Reservation division of the Yuma project, the irrigated acreage of Imperial County is in the Imperial Valley. Sparse rainfall makes the balance of the county a desert waste although many thousand acres require only the application of water to be as productive as the lands now irrigated. For this reason, county statistical data have been utilized to measure growth and development of the Imperial Valley.

Population of Imperial County increased steadily from a few settlers in 1900 to a total of 60,903 in April 1930. From 1930 to 1940 population of the county actually decreased about 2 percent. However, with the availability of a dependable water supply through the All-American Canal new strength and hope were given to the valley residents and Imperial County again began to grow. The 1950 census showed a county population of 62,975, and estimates prepared since that time indicate that the total population of Imperial County has increased to 68,000. Although most of this increase has occurred in the incorporated areas, the increasing agricultural prosperity of the valley made it possible. With agriculture as the basic industry of the area, most of the new suburban population is employed in such related industries as canneries, packing sheds, commercial iceplants, stockyards, box factories, sugar-beet refineries, and other processors and mills established directly as a result of agricultural production. Of course there has been a concurrent increase in the requirements for service and professional fields of endeavor, and in retail trades.

The Coachella Valley, which is a portion of Riverside County, is included in the Coachella Valley County Water District. Statistical data relating to the Coachella Valley area itself are rather limited, but some economic information which may serve as a measure of the growth and development of the valley is available for the larger cities of the valley. The city of Indio is the major trading center in the valley, with an estimated population in 1955 of approximately 8,000. In 1940 Indio had a population of only 2,296. This is an indicator of the tremendous growth which has occurred since construction of the All-American Canal. Coachella, the second largest city in the valley, had an estimated population in 1955 of over 3,000 people and percentagewise shows about the same rate of growth as

Indio. Like the suburban areas in the Imperial Valley, the industrial and manufacturing plants of the Coachella Valley are based largely on the local agricultural production. According to residents of the area, Indio now is just entering a period of unprecedented growth. A population of 30,000 has been predicted by 1974.

Retail trade.—The increase in volume of retail trade is one indicator of the growth that occurs in a specific area. Of course, with the fluctuating purchasing power of the dollar from one year to another, the dollar volume of sales, in a strict sense, would not necessarily measure economic development per se. However, bearing in mind that the purchasing power of the dollar in 1953 was roughly half of what it was in 1939, the figures in the following tabulation of retail sales still indicate a substantial increase in purchasing power, and, indirectly, in the growth of the Imperial Valley.

Major group	Sales		Percent increase 1953 over 1939
	1939	1953	
Food group	$5,832,000	$22,098,000	279
Restaurants and bars	2,192,000	7,333,000	235
General merchandise	2,010,000	11,405,000	467
Apparel	967,000	5,097,000	427
Furniture and household appliances	211,000	2,575,000	1,120
Automotive	4,249,000	14,831,000	249
Service stations	2,632,000	13,607,000	417
Lumber-hardware	3,698,000	11,528,000	212
Drug stores	724,000	2,096,000	190
Other retail	1,206,000	13,694,000	1,035
Total sales	23,721,000	104,264,000	340

Comparable retail trade data for the Coachella Valley are not available, but based on other indications the 1954 volume of retail trade would show a tremendous increase over that which was recorded in 1946, the year previous to the first time when the All-American Canal water became available.

Postal receipts.—Post-office income accrues mainly from the sale of stamps, parcel post, money-order fees, and box rents and comparisons occasionally are affected by changes in rates. However, postal receipts are considered as an economic barometer and frequently are used as an indirect reflection of the growth and development of an area. Based on this barometer, growth of the Imperial and Coachella Valleys clearly is evident. Postal receipts for the city of El Centro, the principal retail trading area for Imperial Valley, amounted to $232,650 in 1954, compared with $82,395 in 1940. Growth in postal receipts for the entire Imperial Valley was at the same rate as the principal city of El Centro, increasing from $188,319 in 1940 to $531,620 in 1954. In other words, postal receipts are nearly 3 times what they were 15 years ago, when Colorado River water was first delivered to the Imperial Valley through the All-American Canal.

In the Coachella Valley, growth in volume of postal receipts during this same period is even more phenomenal. In 1940 postal receipts for the entire lower valley totaled $44,146, and in 1954 had grown to the impressive total of $252,208, or 5.7 times the 1940 level. For the city of Indio, the principal trading center of the Coachella Valley, postal receipts in 1954 were $157,982, or 5.5 times the 1940 total of $28,615. Of course, growth in the Coachella Valley could be expected

to be more than that of the Imperial Valley since in the Coachella Valley the All-American Canal provided a new source of water whereas in the Imperial Valley the canal provided largely an alternate source of supply, but on a dependable basis.

Building permits.—The level at which building construction is maintained provides an economic indicator of the growth and development of an area. Valuation of building permits issued is a measure normally used to indicate rate of new construction. However, total construction activity is not reflected in number of building permits issued for several reasons. First, building permits are not required in several smaller communities and in some of the unincorporated areas. In other areas, permits are required only for large multiple dwellings or for industrial and commercial construction. This is particularly true in Imperial County. Furthermore, there is a general tendency for permits to understate the actual costs of construction. Therefore, such permits provide only a very conservative summary of the volume of building in an area. Generally, building activity was at very low levels immediately prior to and during World War II. For this reason building permit data for the Imperial and Coachella Valley areas have been accumulated only for the 7-year period, 1948 through 1954. The following tabulation shows that construction activity in the Imperial Valley has been maintained at relatively high levels during this 7-year period, totaling $43,303,000, and including among other things the construction of 3,735 new family-dwelling units. It should be kept in mind that these figures are a very conservative estimate of the building activity and do not include an estimate for construction in those areas for which building permits were not required.

Valuation of building permits for Imperial Valley, 1948–54

Year	Valuation	Number of family-dwelling units included
1948	$7,392,000	475
1949	3,612,000	401
1950	5,228,000	427
1951	4,167,000	545
1952	6,503,000	568
1953	8,643,000	637
1954	7,758,000	682
Total	43,303,000	3,735

For the Coachella Valley area prior to October 1952, building permits were issued only in the towns of Coachella and Indio. However since these are the only two major towns in the Coachella Valley, valuation of building permits issued should give a fair indication of the construction activity in urban and suburban areas. Building permits have been required in unincorporated areas in Riverside County only since October 1952. During the 7-year period, 1948 through 1954, building permits valued at $10,680,000 were issued in Coachella and Indio, and included in this total were the construction of 891 new family-dwelling units. The following tabulation shows building permit valuation and number of family-dwelling units constructed annually during the 7-year period.

Valuation of building permits for Coachella and Indio, Calif., 1948–54

Year	Valuation	Number of family-dwelling units included
1948	$491,000	36
1949	699,000	64
1950	2,039,000	229
1951	2,361,000	101
1952	1,046,000	53
1953	1,737,000	192
1954	2,307,000	216
Total	10,680,000	891

Without construction of the All-American Canal and the Coachella distribution system, resulting in a dependable water supply from the Colorado River, it is doubtful if much new construction would have occurred in Indio or Coachella. Certainly it would have been at a much lesser rate in the Imperial Valley. Not only does such construction increase the valuation in these areas, but it provides a great deal of employment both on the spot and other areas where raw materials used in the construction process are produced. The expenditure of private funds of $54 million (a very conservative estimate) for new building in Imperial and Coachella Valleys during the 7-year period could not help but have an influential impact on the economy of the Nation.

Bank deposits.—Bank deposits are considered to be a good indicator of economic health in an area. In Imperial County bank deposits of individuals, partnerships, and corporations increased from $9,436,000 in 1941 to $55,294,000 in 1954. These figures exclude interbank and governmental deposits. Also, the figures for savings and loan associations and other nonbanking institutions are excluded.

Bank resources in the Coachella Valley have grown from $9,302,000 in 1946 to $19,300,000 in 1954. In Indio, the principal trading center of the area, bank resources have grown from $5,132,000 in 1946 to $10,600,000 in 1954. Thus, it can be seen that the growth of bank deposits for the entire valley has kept pace with the banking growth of the principal trading center. The rate of growth in bank deposits in Imperial County, and Riverside County in which the Coachella Valley is located, is among the highest of the 14 southernmost counties of the State of California.

Utility connections.—An additional indicator of the growth and economic prosperity of an area is reflected in the number of customers receiving electric power and the number of telephones in service. Since 1944 the Imperial Irrigation District has been the distributor of electric power in the Coachella and Imperial Valleys. This includes residential, commercial, industrial, agricultural pumping and other users of electrical energy. Before 1944 the Imperial Irrigation District was distributing power in the Imperial Valley only in competition with the California Electric Power Co. and statistical data on number of customers prior to that date are not readily available. The total number of power customers increased from 18,684 in 1944 to approximately 29,600 in 1953. In 1954, there was an increase of 935 in average number of customers, 661 of which were in Imperial County and 274 in the Coachella Valley. The average annual usage per domestic

customer climbed to 4,891 kilowatt-hours in 1954 as compared to 4,500 in 1953. The Imperial and Coachella Valley customers are among the highest users of electrical energy in the United States, and use more than twice as much as residential customers in such places as Los Angeles and Pasadena, Calif. Use of refrigeration air conditioners, home freezers, large refrigerators, water heaters, and other electrical appliances, most of which are manufactured in Eastern States, is largely responsible for the heavy usage of electrical energy by Imperial and Coachella Valley residents.

There has been a tremendous growth in the number of telephones in service in both the Imperial and Coachella Valleys from 1939 to 1954. Chart No. 4 shows this rate of growth very clearly. For the Imperial Valley it is shown that the number of telephones in service began increasing almost immediately after the availability of All-American Canal water. For the Coachella Valley some increase is shown from 1939 to 1947, but the rate of growth increased substantially as soon as Colorado River water was available to the valley in the latter part of 1947. The number of telephones in service in Imperial Valley from 1940 to 1954 increased 175 percent. In the Coachella Valley from 1947 to 1954 the number of telephones in service increased 216 percent.

Hydroelectric installations on All-American Canal.—As mentioned in an earlier section of this report, certain hydroelectric-power possibilities existed on the All-American Canal due to the difference in elevation between the diversion point at Imperial Dam and the below sea level elevation of many of the lands to be served. These power possibilities in a sense represent a byproduct of irrigation. In recognizing power potentialities on the All-American Canal, contracts for construction of works between the Government and the two districts made provision for application of power revenues to reduce annual payments. Shortly thereafter, Imperial Irrigation District initiated a program providing for both the development and distribution of power in the area to be served by the All-American Canal. Coachella Valley County Water District participates in revenues in accordance with an agreement reached with Imperial in 1934. Hydroelectric plants have been installed at drops 2, 3, and 4 on the All-American Canal, with capacities of 10,000, 4,800, and 19,600 kilowatts, respectively. In addition, construction is now underway on a hydroelectric plant located at Pilot Knob Check and Wasteway on the All-American Canal, which will have an installed capacity of 33,000 kilowatts. These power installations have all been financed by the Imperial Irrigation District through the issuance of revenue bonds. In addition to providing the district with a source of low-cost electrical energy, the hydroelectric plants actually result in the conservation of other natural resources, such as coal, gas, or oil. If the electrical energy produced from the installed hydro plants on the All-American Canal, plus the plant under construction at Pilot Knob, had to originate from oil-fired steam plants, consumption of about one-half million barrels of fuel oil per year would be required.

In addition to the power developments on the All-American Canal, Imperial Irrigation District obtains 30,000 kilowatts of generation at Davis Dam on the Colorado River, and the district maintains diesel and steam plants in the valley proper with an installed capacity of 62,000 kilowatts. There does not appear to be any letup of the con-

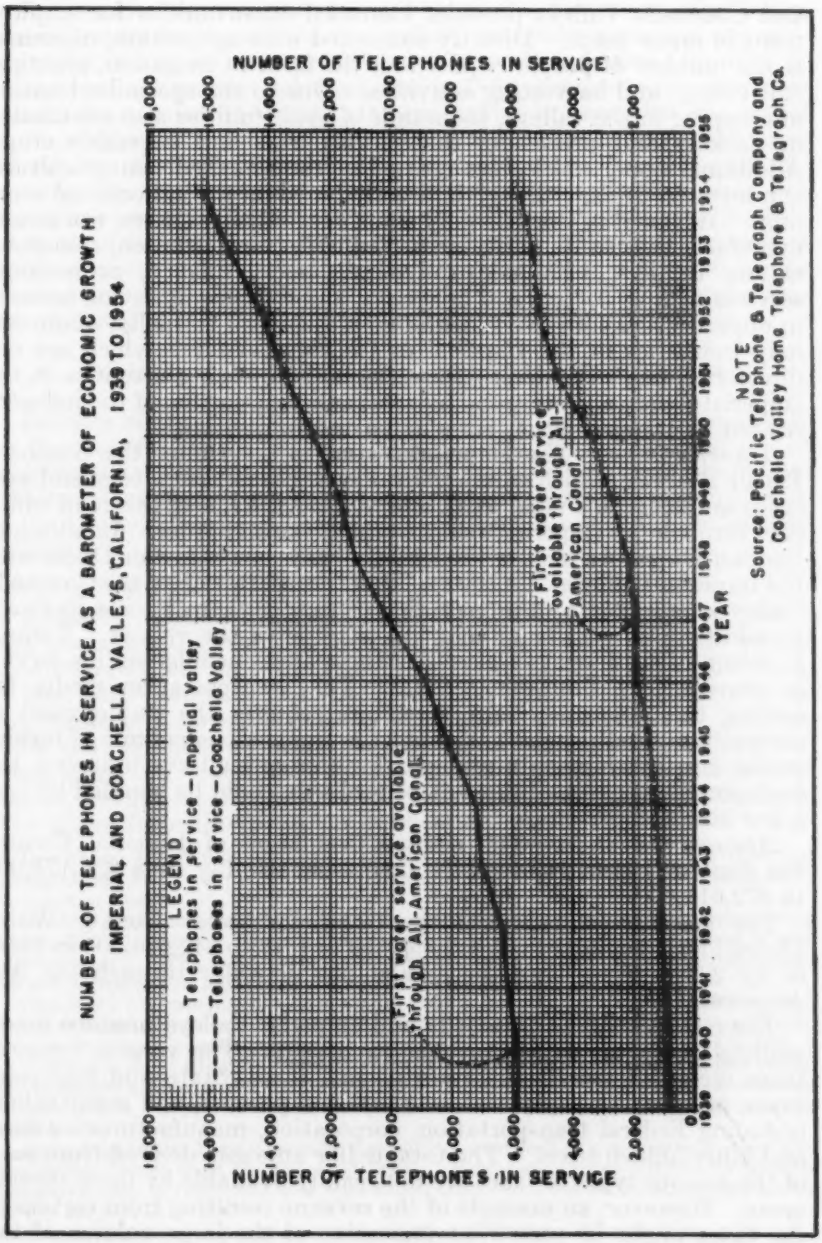

NUMBER OF TELEPHONES IN SERVICE AS A BAROMETER OF ECONOMIC GROWTH
IMPERIAL AND COACHELLA VALLEYS, CALIFORNIA, 1939 TO 1954
LEGEND
Telephones in service — Imperial Valley
Telephones in service — Coachella Valley
First water service available through All-American Canal
First water service available through All-American Canal
NUMBER OF TELEPHONES IN SERVICE
YEAR
NOTE
Source: Pacific Telephone & Telegraph Company and Coachella Valley Home Telephone & Telegraph Co.

CHART 4

tinued growth in number of customers and power load in the Imperial and Coachella Valleys.

Employment.—Broadening of the agricultural base in the Imperial and Coachella Valleys provides increased opportunities for employment in many fields. Directly connected with agriculture, of course, is the number of people required on the farm in irrigation, planting, cultivating, and harvesting activities. Due to the specialized nature of cropping in the valleys, thousands of opportunities also are created in packing and processing the various fruit and vegetable crops. Additional opportunities are created in the so-called nonagricultural employment fields, although indirectly based on the agricultural economy. Included in this category are construction workers, workers in manufacturing plants, those connected with transportation, communication, utilities, wholesale and retail trade, finance, professional services such as doctors and attorneys, and the accompanying increase in opportunities for governmental employment. Actually, about the only industries in the Imperial or Coachella Valleys which are not directly related to agriculture are the limited mining activities in the Imperial Valley and surrounding area, and that portion of the industry related to transportation catering to the tourist trade.

Transportation.—The Imperial Valley is served by the Southern Pacific Railway, which enters the valley at the northern edge and proceeds southeast to Yuma, Ariz., and by a branch line of this road which goes through the Imperial Valley to the Mexican border. In addition, the San Diego, Arizona & Eastern Railway connects San Diego with the Imperial Valley at El Centro. Rail transportation to the Coachella Valley is provided by the main line of the Southern Pacific Railway. In addition, several truck and bus lines serve the valleys. Various United States highways traverse the area and scheduled airline service is provided by Bonanza Airlines. The transportation media for serving this desert agricultural empire requires the employment of several thousand people. Without the tremendous volume of inshipments and outshipments required for the agricultural industry, the transportation phase of the valleys probably could be handled by just a few hundred persons.

Assessed valuation.—The assessed valuation of Imperial County has doubled from 1940 to 1954, increasing steadily from $36,175,000 to $72,611,000.

The assessed valuation of the Coachella Valley County Water District has increased from $12,855,960 in 1947 to $42,694,500 in 1954, or by 232 percent since the availability of water through the All-American Canal.

Tax revenues.—The Coachella and Imperial Valleys produce many millions of dollars in tax revenue each year. The various types of taxes include Federal and State income taxes, State and city sales taxes, property taxes, special-use taxes and permits, and many others including Federal transportation, corporation, manufacturer's excise, and other hidden taxes. The total dollar amounts derived from each of the various types of taxes are not readily available by these specific areas. However, an example of the revenue resulting from certain of the taxes might be somewhat indicative of the large volume of tax money which might be expected from such an agricultural area. For instance, in 1954 nearly $2,300,000 was paid from Imperial County in the form of the 3 percent State retail-sales tax alone. Even so, many

types of retail sales are exempt from the State sales-tax levy. In 1954, the combined county, city, and district property-tax levy in Imperial County produced nearly $5 million.

Figures are not available for the Coachella Valley, but for Indio, the major trading center in the valley, the State collected approximately $305,000 from the retail-sales tax. In addition, the city of Indio levies a 1 percent sales tax, and in 1954 revenue to the city from retail sales totaled $101,823. It can readily be seen that the broad tax base which is provided by developed agricultural areas contributes heavily to the local, State, and Federal tax take. Capital expenditures by the Government for such developments as the All-American Canal are not only repaid pursuant to Reclamation law, but provide all levels of Government with many, many times the cost of the project in tax revenue. Such stabilized areas also are less of a drain on public treasuries due to elimination or reduction in the frequency and intensity of drought and related disasters requiring public assistance.

NATIONAL BENEFITS OF ALL-AMERICAN CANAL SYSTEM

Benefits of the All-American Canal system are not limited locally to the Imperial and Coachella Valley areas, nor is it limited to the additional tax dollars which find their way to various governmental treasuries. Other incidental benefits accrue to the entire population of the United States. A brief summarization of some of those benefits follows.

Improved national diets

Recently, a publication, entitled "The West Changed Our Diet," was issued by the National Reclamation Association with the report based largely on the extension of remarks of the Honorable A. L. Miller, Representative from the State of Nebraska, in a speech before the House of Representatives on Wednesday, June 1, 1955. A quote from that publication brings to light the importance of the irrigated fresh fruit and vegetable industry in the Western States, which, of course, include the highly productive Imperial and Coachella Valleys. The quote from the foregoing publication appears below.

> Just as the automobile revolutionized the transportation industry, the West has changed our diet. We still eat three meals a day but now we have a better diet and tastier meals.
>
> Doctors and nutritionists are quick to point out that the average person living in the United States is more healthy and heftier than the average person of any other country. The reason is simple. We are eating better than ever before and we are enjoying the highest diet standard in the world.
>
> One of the big reasons for this is we are able to buy the nourishing foods required for a balanced diet in our well stocked grocery stores. Fresh fruits and vegetables, thanks to irrigation and reclamation, are plentiful and available the year round.
>
> There are more than 200 separate farm commodities and their products which are classified among fruits and vegetables. Most of these are perishable, seasonal in production, subject to use in many different ways and variable in the markets they have.
>
> According to the Department of Agriculture over half of our domestic supply of vegetables comes from the irrigated West. However, a more impressive figure is the percentage of fruits and tree nuts which come from the West, about two-thirds of our supply.
>
> A sharp increase in per capita consumption of fruits and vegetables in the past few decades reflects changed eating habits of the American people. Several reasons have caused this change. One is our per capita income has risen considerably and another is the recognition of the importance of these foods in our diet.
>
> But the largest single contribution to this change has been the ability of the fruit and vegetable growers to produce enough to meet the demands.

Without the contribution of the All-American Canal system to the agricultural productive capacity of our Nation, particularly with respect to fresh fruits and vegetables, there would be many specialty crops which would not be available in sufficient supply during winter months. For instance, lettuce is a crop which is eaten by all of us practically every day of the year. A salad is hardly complete without it. The Imperial Valley is an important supplier of this fresh-vegetable crop during the winter and early spring months.

In recent years, there has been a tremendous increase in the per capita consumption of fruits and vegetables in the United States. Nutritionists have welcomed these increases since the nutrients from these crops were sorely needed in the substandard diets of many of the Nation's families.

The nutritive value of fresh fruits and vegetables is considerably higher than that of the frozen or canned counterparts. Table 2 gives a comparison of the nutritive value of various fresh, canned, and frozen vegetable crops. The availability of such crops in fresh form from the Imperial and Coachella Valleys during the fall, winter, and spring months contributes heavily to the Nation's improved diet. The fact that such fresh fruits and vegetables from this area actually are made available to dinner tables throughout the Nation is substantiated by table 3, which shows the nationwide distribution of cantaloups, carrots, lettuce, and early table grapes from this area during specified periods. The tabulation does not show total production nor does the distribution presented therein represent the total distribution of the crop. Rather it serves as an illustration only of the widespread consumption of various Imperial and Coachella Valley crops by our national population.

Chart No. 5 shows the normal harvesting period for major vegetable and fruit crops produced in the area served by the All-American Canal. The chart portrays clearly that most of the food crops are planned so that harvest will come at a time when the area is not in competition with many of the country's other producing areas. In fact, very few vegetable or fruit products originate from the Imperial and Coachella Valleys during the months of June, July, August, and September.

TABLE 2.—*Comparison of nutritive value of various fresh and processed vegetables*

Food	Water (percent)	Food energy (calories)	Protein (grams)	Fat (grams)	Carbohydrate (grams)	Calcium (milligrams)	Phosphorus (milligrams)	Iron (milligrams)	Vitamin A (international units)	Thiamine (milligrams)	Riboflavin (milligrams)	Niacin (milligrams)	Ascorbic acid (milligrams)
Asparagus:													
Fresh	93.0	95	10.0	.9	17.7	95	282	4.1	4,540	.73	.86	6.4	150
Canned	93.6	82	8.6	1.4	13.2	82	195	7.7	2,740	.32	.45	4.1	68
Beans, green:													
Fresh	88.9	159	10.9	.9	34.9	295	200	5.0	2,860	.36	.50	2.3	86
Canned	93.5	82	4.5	.5	19.1	123	86	6.4	1,861	.14	.18	1.4	18
Beets:													
Fresh	87.6	190	7.3	.5	43.5	123	195	4.5	91	.09	.23	1.8	45
Canned	90.3	154	4.1	.5	35.9	68	132	2.7	91	.05	.09	.5	23
Broccoli:													
Fresh	89.9	132	15.0	.9	25.0	590	345	5.9	15,890	.45	.95	5.0	536
Frozen	92.2	104	11.3	.9	19.5	454	268	4.5	10,578	.32	.55	4.1	341
Carrots:													
Fresh	88.2	191	5.5	1.4	42.2	177	168	3.6	54,480	.27	.27	2.7	27
Canned	92.2	127	2.3	1.8	27.7	100	109	2.7	54,480	.09	.09	1.4	9
Corn, sweet:													
Fresh	73.9	418	16.8	5.5	93.1	41	549	2.3	1,771	.68	.55	7.7	55
Frozen	78.0	350	14.5	4.1	78.5	36	459	1.8	499	.55	.45	6.4	36
Canned	80.5	304	9.1	2.3	73.2	18	232	2.3	908	.14	.23	4.1	23
Spinach:													
Fresh	92.7	91	10.4	1.4	14.5	367	250	13.6	42,767	.50	.91	2.7	268
Canned	92.3	91	10.4	1.8	13.6	408	150	7.3	30,827	.09	.45	1.4	64
Tomatoes:													
Fresh	94.1	91	4.5	1.4	18.2	50	123	2.7	4,994	.27	.18	2.3	104
Canned	94.2	86	4.5	.9	17.7	50	123	2.7	4,767	.27	.14	2.3	73

Source: Compilation of United Fresh Fruit and Vegetable Association based on U. S. Department of Agriculture Handbook No. 8, June 1950.

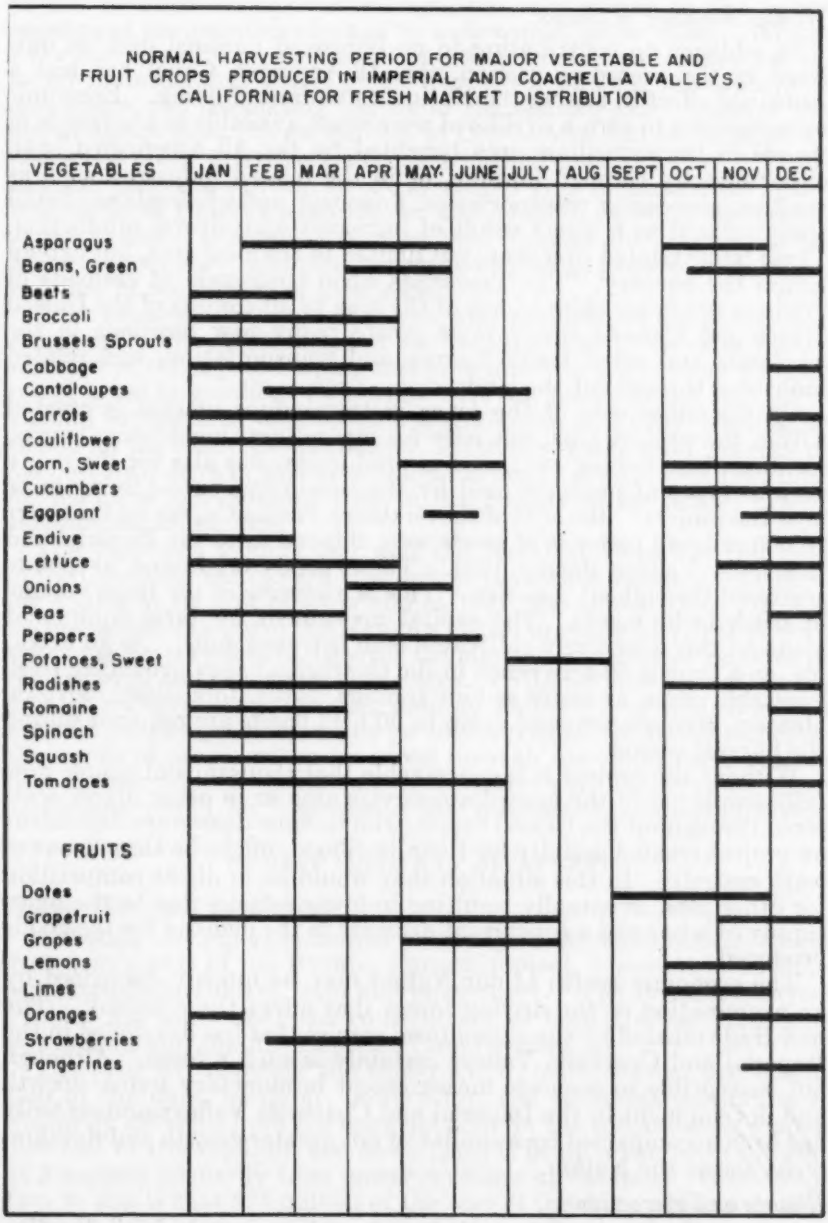
TABLE 3.—*Illustration of nationwide distribution of certain Imperial and Coachella Valley fruit and vegetable crops during specified months, in railroad-carlot equivalents, 1954* [1]

State of destination or unload	Cantaloups, May 1954		Carrots, May 1954		Lettuce, February 1954		Early table grapes, June 1954	
	Truck	Rail	Truck	Rail	Truck	Rail	Truck	Rail
Alabama				4	9	24		
Arizona	14		12	3	23			
Arkansas			1		4	15		
California	490		439	29	1,020	11	139	1
Colorado	5	3	15	7	67	30	18	
Connecticut		2		10		39		23
Delaware								
Florida	4	1	2	15	30	12		17
Georgia			1	8	1	53	6	7
Idaho	4		4		19			
Illinois		21		134	1	372		144
Indiana		1		11	1	133		3
Iowa	3	1	11	1	42	51		
Kansas	4		7	4	24	28		9
Kentucky				5		56		
Louisiana	10	2	1		1	9	18	2
Maine		1		7		13		
Maryland		1		25		108		26
Massachusetts		6		63	1	238		101
Michigan		5		75		306		49
Minnesota		7	3	25	13	115		22
Mississippi				6				
Missouri	1	14	3	52	35	170	12	29
Montana	6	2	11		20	5		
Nebraska	5		11		57	19		
Nevada	6		6		13			
New Hampshire								
New Jersey				18		54		21
New Mexico	8		8		24			
New York		42		228	1	741		208
North Carolina				5	1	31		2
North Dakota			4		8			
Ohio		9		47		439		60
Oklahoma		1	3	3	30	19		5
Oregon	29		36	6	88	3		2
Pennsylvania		23		111		532	2	126
Rhode Island		1		19		43		10
South Carolina				5		23		
South Dakota			2		14	6		1
Tennessee		2		2		84		2
Texas	21		34	4	160	67	11	5
Utah	13		23		60	1		1
Vermont								
Virginia		1		13		72		
Washington	38		54	22	112	21	11	1
West Virginia		1		4		25		
Wisconsin		7	1	19	3	76		31
Wyoming			1		6			
Washington, D. C.		6		13		85	2	6
Canada	2	5	21	151	21	249		64
Total	663	165	715	1,154	1,911	4,378	219	978

[1] Represents widespread distribution of specialty crops as compiled from available data, and does not represent total production.

Source: Compiled from data appearing in "Carlot Unloads of Certain Fruits and Vegetables in 160 United States and 5 Canadian Cities, also Truck Unloads in 20 United States Cities, Calendar Year 1954," and in lettuce, carrot, and melon summaries for Imperial Valley published by the Federal-State Market News Service.

CHART 5


NORMAL HARVESTING PERIOD FOR MAJOR VEGETABLE AND FRUIT CROPS PRODUCED IN IMPERIAL AND COACHELLA VALLEYS, CALIFORNIA FOR FRESH MARKET DISTRIBUTION
VEGETABLES
JAN
FEB
MAR
APR
MAY
JUNE
JULY
AUG
SEPT
OCT
NOV
DEC
Asparagus
Beans, Green
Beets
Broccoli
Brussels Sprouts
Cabbage
Cantaloupes
Carrots
Cauliflower
Corn, Sweet
Cucumbers
Eggplant
Endive
Lettuce
Onions
Peas
Peppers
Potatoes, Sweet
Radishes
Romaine
Spinach
Squash
Tomatoes
FRUITS
Dates
Grapefruit
Grapes
Lemons
Limes
Oranges
Strawberries
Tangerines

The title "America's winter garden" is an appropriate one for the Imperial and Coachella Valley area. The contribution of the area to the Nation's diet truly is significant.

Higher standard of living

In addition to contributing to an improved national diet, as outlined in the preceding section, the All-American Canal has had a beneficial effect in raising the Nation's standard of living. Economic opportunities to earn a livelihood were made available to thousands of people in the immediate area benefited by the All-American Canal, either directly through farming, or in the related industries such as packing, processing, transportation, financing, and wholesale and retail trade created as a direct result of increased agricultural production. These latter related effects are not limited to the local area, but extend across the country. The thousands upon thousands of carloads of produce which are shipped out of the area to all corners of the United States and Canada surely must create many new positions in the wholesale and retail trade, finance and transportation, and related industries throughout the land.

On the other side of the fence, a tremendous market is created within the project area, not only for agricultural machinery, trucks, fertilizer, insecticides, etc., used in production, but also for the many various types of products used by the consuming public living in or near the project. Records of the Southern Pacific Co. reveal that over 20,000 railroad carloads of goods were shipped in to the Imperial and Coachella Valleys during 1954. These goods originated at points scattered throughout America. This is exclusive of the large volume of truck inshipments. The capital investment for farm equipment alone on this intensively cultivated land is tremendous. As an example, on a typical 80-acre ranch in the Coachella Valley producing fresh vegetable crops, as many as four tractors, cultivators, disks, harrows, planters, etc., are required. Up to 90 field hands are required during the harvest period.

Without the project it is conceivable that thousands of people now fully employed in the immediate service area or in other places scattered throughout the United States, who to some degree are dependent on project created activity for their livelihood, might be thrown out of work entirely. In this situation they would be in direct competition for other jobs, eventually resulting in lower salaries due to the oversupply of labor and a concurrent decrease in the demand for the goods produced.

The economic health of our Nation may be quickly diagnosed by an examination of the driving forces that affect the economy. The new trade created by the agricultural empire that has developed in the Imperial and Coachella Valleys certainly is such a force. Although not susceptible to accurate measurement in monetary terms, growth and development in the Imperial and Coachella Valleys undoubtedly has been accompanied by a similar, if not greater growth and development across the Nation.

Resorts and recreation

The usual avenues of recreation, such as theaters, television, bowling alleys, parks, golf courses, and tennis courts, are available in all communities throughout the Coachella and Imperial Valleys. In addition, this desert area, which was once the dread of travelers, is becom-

ing one of the West's most fascinating playgrounds visited by thousands upon thousands of tourists each year. With the development of agricultural possibilities of the area and the concurrent construction of the required transportation facilities, easy access to the many wonders of the desert can be had by automobile, air, or train. Within a few minutes of the valley's air-conditioned hotels and motels can be found the wide open spaces of the desert, the pleasing atmosphere of mountains, the fascinating beauty of the shifting sand dunes or the placid Salton Sea. Even the lure of Old Mexico can be satisfied by just a few miles' drive from any place in the Imperial Valley. Thousands of people are drawn to the area each year to participate in the International Desert Cavalcade, an annual affair in which the people of the irrigated Colorado desert on both sides of the United States-Mexican boundary celebrate in parade and song, pageant and dance, in honor of the history of their region.

Boat races of a national character also are held on the Salton Sea each year. The combination of the Salton Sea and the warm winter sunshine is rapidly developing this area into one of the most popular resort areas in southern California. Doves, quail, ducks, and geese abound in the area and provide many hours of happy hunting in season for the country's sportsmen. Even the "rockhound" has one of his best field days in this area and he is nearly always well rewarded for his hikes and camping trips in the vicinity of the Salton Sea or surrounding mountains.

The Riverside County fair and the National Date Festival held in the Coachella Valley each year delight thousands of guests. Attracting 45,000 at its first postwar run in 1947, the annual Date Festival event has become one of the Nation's fastest drawing fairs. It doesn't take long for travelers to discover the many spectacular attractions in the Imperial and Coachella Valley area. Without development of the area as an agricultural empire, some of nature's most beautiful and unusual scenery probably would go unobserved by the thousands upon thousands of people who now travel through the valley each year as part of their planned vacations. If the valley were undeveloped, these attractions would be forgotten in the vastness of the desert reaches.

PROJECT COSTS AND REPAYMENT

Hoover Dam and powerplant

Although this report is limited primarily to the All-American Canal system as a part of the Boulder Canyon project, it cannot be entirely separated from Hoover Dam and powerplant. The Boulder Canyon Project Act authorized the construction of both Hoover Dam and powerplant and the All-American Canal system.

The plan for financing the construction, maintenance, and operation of the dam, reservoir, powerplant, and incidental structures is distinctly different from the financial plan for the All-American Canal. The cost of Hoover Dam and powerplant is being repaid with interest at 3 percent primarily from power revenues at the dam. One exception to this is that $25 million of the cost of the dam, which was allocated to flood control, will be carried interest free by the Government until 1987. It is contemplated that power revenues will then be used to repay this cost with interest. The major cost of Hoover Dam and

powerplant, with the exception of that portion allocated to flood control, will be fully repaid with interest by 1987.

All revenues from the project are paid into a special fund known as the Colorado River Dam fund. Through this arrangement receipts and expenditures of the Boulder Canyon project are kept separate from those of any other project and from the general funds of the Federal Government.

All-American Canal system

In accordance with the financial plan of the All-American Canal system, repayment of the cost is being made by the lands benefited according to the benefits received. The cost of the All-American Canal system is being repaid without interest, which is in contrast to the financial plan for the rest of the Boulder Canyon project on which an interest charge is included. None of the revenues derived from the sale of power generated at Hoover Dam or for the sale of water for potable purposes outside the Imperial and Coachella Valleys are used to pay for the All-American Canal. Those revenues are specifically reserved for the rest of the project. However, as stated in an earlier section, the revenue derived from powerplants located on the canal is utilized to help repay the water users' obligation to the Federal Government.

In addition to the Imperial Irrigation District and the Coachella Valley County Water District, the cost of the All-American Canal is being shared by the city of San Diego and the Gila project, the latter in Arizona. The city of San Diego, by contract dated October 2, 1934, contracted with the Government for a capacity of 155 cubic feet of water per second in the main All-American Canal to be used by the city for the benefit of its inhabitants. Although the city of San Diego through the San Diego County Water Authority later arranged to take this water through facilities of the Metropolitan Water District's Colorado River aqueduct with diversions from Havasu Lake above Parker Dam, it is still obligated to pay for its contracted portion of the All-American Canal. Since the Gila project utilizes Imperial Dam for diversion of water to Arizona, this project is obligated to pay a proportionate share of the cost of said dam as well as Laguna Dam. The cost of turnouts serving the Yuma project are paid for by it.

Repayment of the cost of the All-American Canal, including the Coachella branch, by the three All-American Canal contractors in California (Imperial Irrigation District, Coachella Valley County Water District, and the city of San Diego), commenced on March 1, 1955. The total cost of the canal is to be repaid by the 2 districts over a period of 40 years, and by the city over 38 years.

In accordance with a cost allocation report dated April 7, 1954, the following amounts were allocated to each of the California contractors under their respective repayment contracts covering cost of the All-American Canal and appurtenant works:

Imperial Irrigation District	$25, 020, 000. 90
Coachella Valley County Water District	13, 410, 014. 47
City of San Diego	465, 642. 68

Advance payments amounting to nearly $1 million have been made by the Imperial Irrigation District on its share of the cost since its net power proceeds from power development on the All-American Canal have been paid into the Colorado River Dam fund for application on that district's obligation.

Coachella Valley distribution system

The Coachella Valley County Water District entered into a contract on December 22, 1947, with the United States for construction of a distribution system, protective works, and drainage works for the benefit of those district lands that would be served water from the All-American Canal in the Coachella Valley. In accordance with that contract, an underground distribution system was constructed in the valley to serve approximately 75,000 acres of land, for which the district is obligated to pay the United States $13,500,000. Six irrigation blocks were established in the Coachella Valley, each having a development period of 8 years. Pursuant to Reclamation law, the payment of this obligation will not commence until the end of the development period for each respective block. The initial payment on this obligation will commence on March 1, 1959. In addition to the foregoing, certain flood-protective works were constructed at a cost of $4,553,801.49, which is nonreimbursable as provided in the act of August 4, 1939 (53 Stat. 1187). Like the All-American Canal, repayment of the $13,500,000 for the Coachella distribution system will be without interest. In addition to the Federal investment, millions of dollars of private funds have been invested in the Imperial and Coachella Valleys for additional irrigation facilities and for operation and maintenance.

GROWTH OF AN ECONOMY

The foregoing pages have provided ample evidence of the striking rate of economic growth and development in the Imperial and Coachella Valleys due largely to the construction of the All-American Canal system, one of the major features included in the Boulder Canyon Project Act. The gains are visible not only in agricultural growth, but in many other aspects of the economy which are measured by a variety of recognized economic indicators. In order to get a picture of this growth and development at a glance, tables 4 and 5 show in brief a summary of the economic trends of the Imperial Valley and the Coachella Valley, respectively.

From both an economic and social point of view, it can hardly be denied that the All-American Canal development is of great value to the entire Nation. It is a project which is continually rendering services and filling a vital need in the country's rapidly growing economy. Not only is the agricultural production of the Imperial and Coachella Valleys an important industry in its own right but, based on an assured and dependable water supply provided by the All-American Canal, it furnishes an unusually solid and stable foundation on which related economic growth throughout the Nation can be continued.

TABLE 4.—*Summary of economic trends, Imperial Valley, Calif.*

[First water deliveries through All-American Canal system made in latter part of 1940]

	1940 [1]	1954 [1]	Percent change
Agricultural measures:			
Crop values:			
Field crops	$5,321,152	$65,037,185	+1,122
Vegetable and truck crops	$12,795,078	$34,106,689	+167
Fruit and nut crops	$607,952	$679,448	+11
Livestock and livestock products	$7,965,801	$29,786,484	+274
Production in carload equivalents	53,031	109,055	+106
Acreage irrigated	416,709	452,391	+9
Nonagricultural measures:			
Assessed valuation	$36,175,677	$72,611,555	+101
Bank deposits	$9,436,000 (1941)	$55,294,000	+486
Population:			
Imperial County	59,740	[2] 68,000	+14
El Centro (county seat)	10,017	15,383	+54
Automobile registrations	21,730	23,218 (1953)	+7
Truck registrations	2,286	7,336 (1953)	+221
Retail sales	$23,721,000 (1939)	$100,161,000	+322
Number of employees:			
Wholesale trade	893 (1939)	2,096 (1948)	+135
Retail trade	2,143 (1939)	3,178 (1948)	+48
El Centro postal receipts	$82,395	$232,650	+183
Valley postal receipts	$188,319	$531,620	+182
Number of telephones in service	5,865	16,127	+175
New family dwellings constructed	139 (1946)	682	+391
Individual incomes—Civilian residents	$30,043,000	$136,100,000 (1952)	+353
Number of tax returns, $5,000–$10,000	189	3,159 (1953)	+1,571
Number of tax returns over $10,000	46	877 (1953)	+1,806

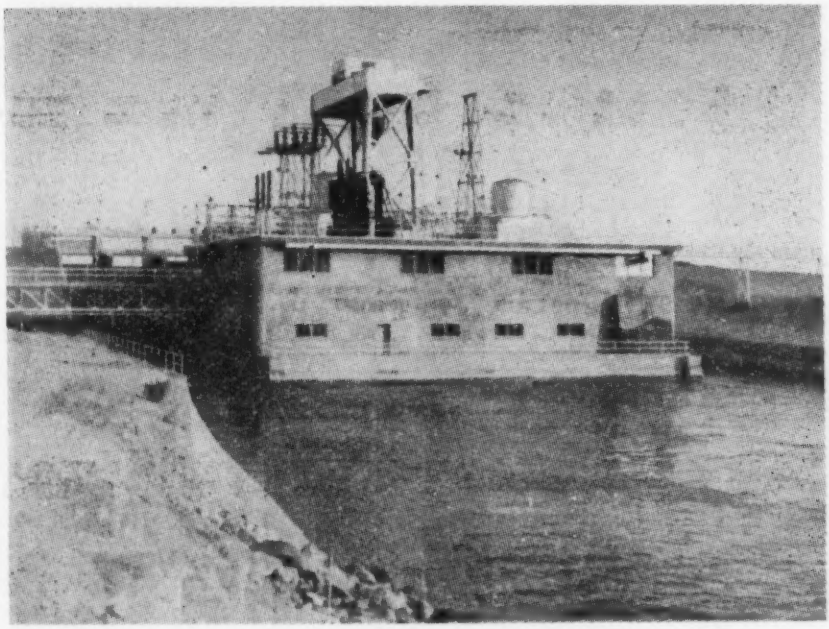
[1] Where figures for 1940 and 1954 were not available, the year represented is shown in parentheses.
[2] Estimate.

TABLE 5.—*Summary of economic trends, Coachella Valley, Calif.*[1]

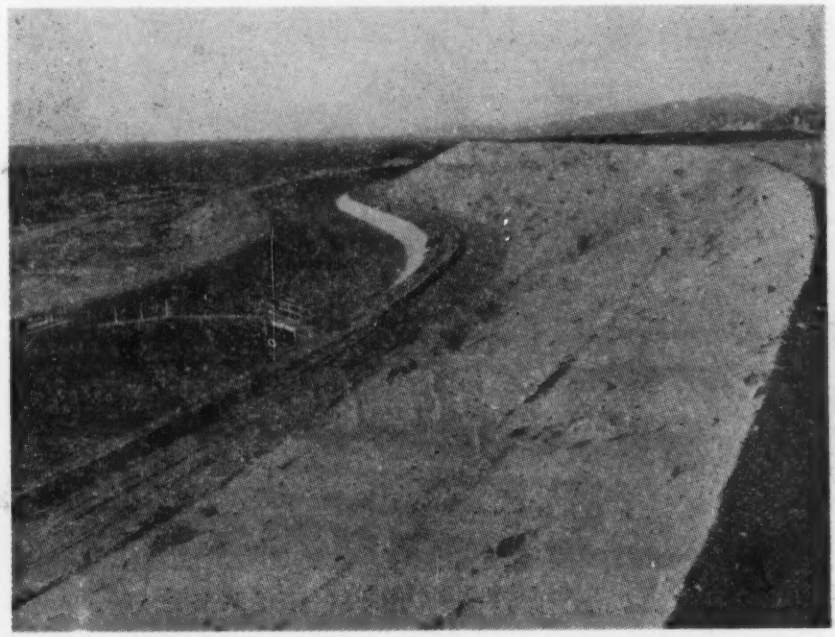
[First water deliveries through All-American Canal system made in latter part of 1947]

	1946 [2]	1954 [2]	Percent change
Agricultural measures:			
Crop values:			
Field crops	$367,957	$3,762,271	+922
Vegetable and truck crops	$4,282,352	$8,334,114	+95
Fruit and nut crops	$8,459,198	$12,195,588	+44
Livestock	([3])	$1,000,000+	----------
Crop production—Carload equivalents	8,420	14,088	+67
Acreage irrigated	21,359	50,446	+136
Nonagricultural measures:			
Assessed valuation (Coachella Valley County Water District)	$12,855,960 (1947)	$42,694,500	+232
Bank resources:			
Coachella Valley	$9,302,000	$19,300,000	+107
City of Indio	$5,132,000	$10,600,000	+107
Population:			
Indio	2,296 (1940)	[4] 7,000	+205
Coachella	1,000 (1940)	[4] 3,000	+200
Mecca	50 (1940)	[4] 500	+900
Postal receipts:			
Coachella Valley	$44,146 (1940)	$252,208	+470
City of Indio	$28,615 (1940)	$157,982	+452
Valley telephones in service	1,823	5,768	+216
Valley electric customers	3,123	7,098	+127
Power demand (peak kilowatts)	9,100	17,100	+88
Indio building permits	$324,735	$1,724,490	+430
New family dwellings—Indio	23	149	+548
Valley school enrollment	1,929 (1940)	5,060	+162
Land value per acre—Undeveloped raw desert land:			
No water	$25 (1938–1940)	----------	----------
Canal water	----------	$250	+900

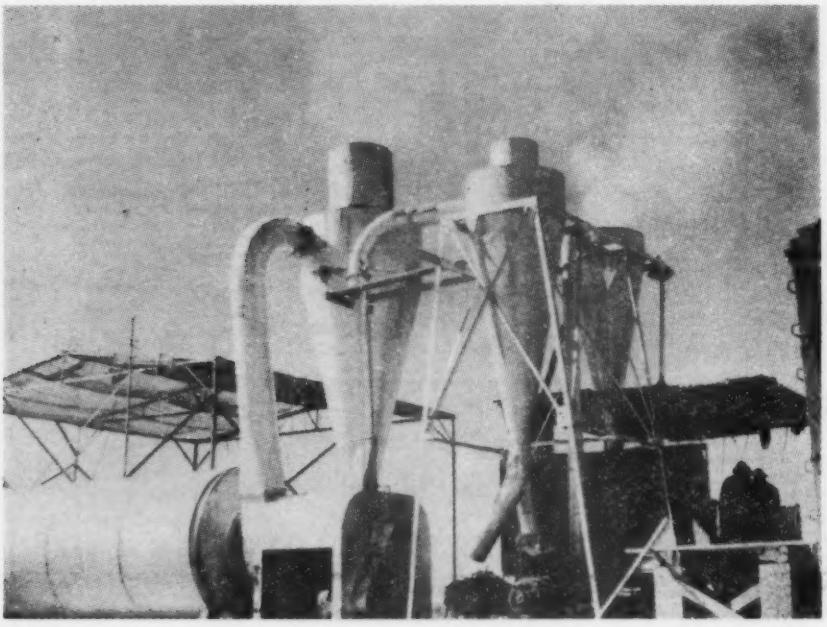
[1] Available statistical data for entire valley are limited. Some of the economic indicators shown are for the city of Indio only, which is the principal trading center in the Coachella Valley.
[2] Where data relates to years other than 1946 and 1954, the year represented is shown in parentheses.
[3] Negligible.
[4] Estimate.



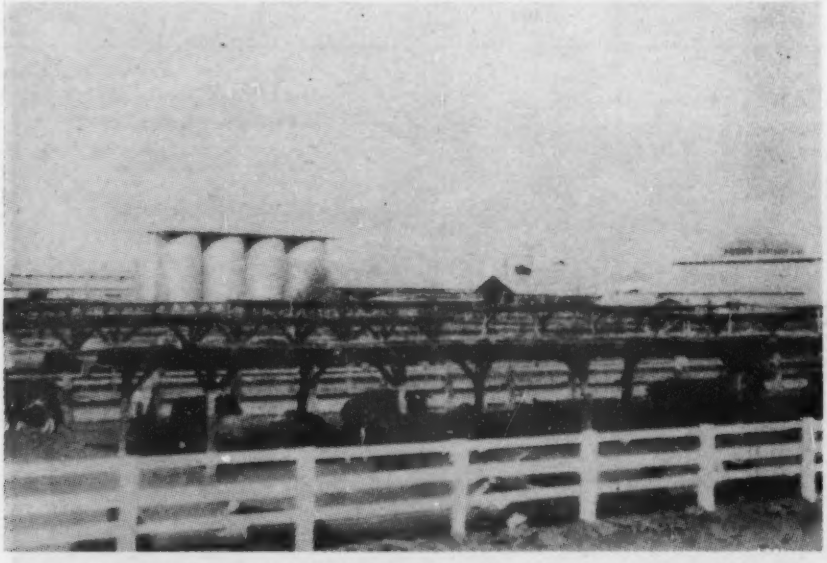
Hydroelectric plant installed at Drop No. 2 on All-American Canal (capacity, 10,000 kilowatts).



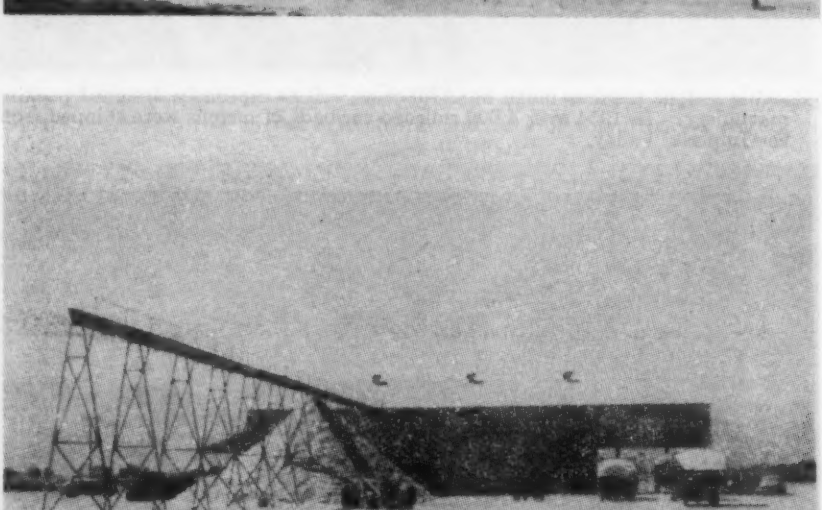
The 123-mile long Coachella Canal transports life-giving water, enabling man to transform worthless desert into valuable farmland.



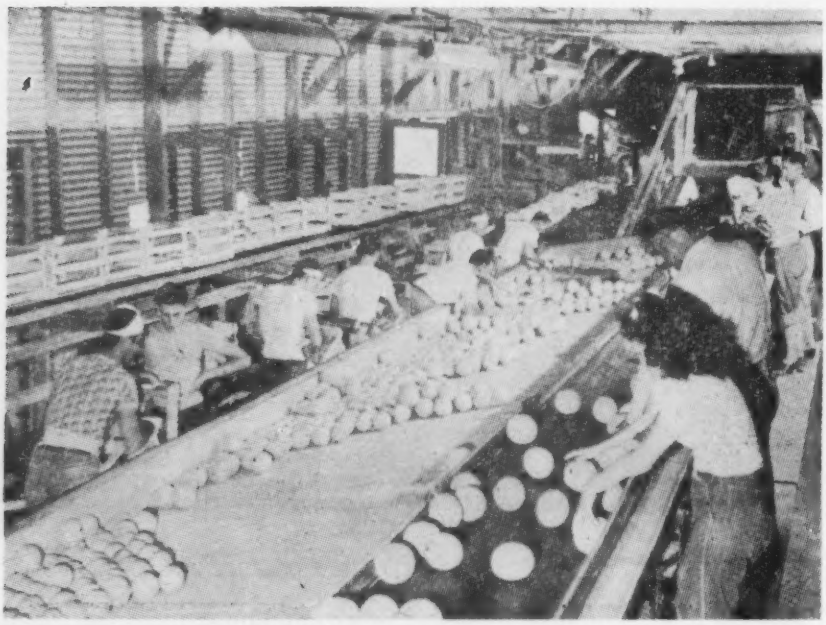
Alfalfa dehydrating plants have been constructed in many locations throughout the area.



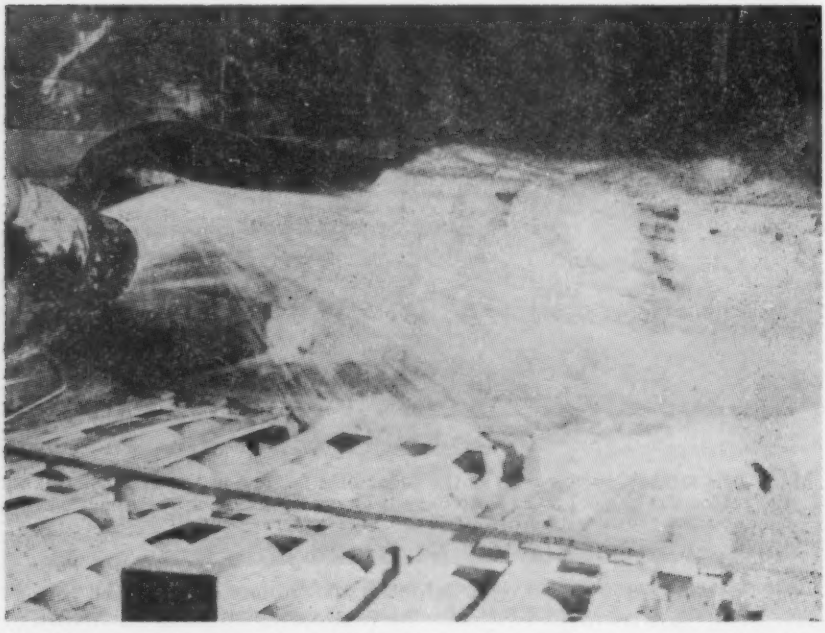
Feeding livestock is a multimillion dollar industry. Feed processing and mixing mills can be seen in the background.



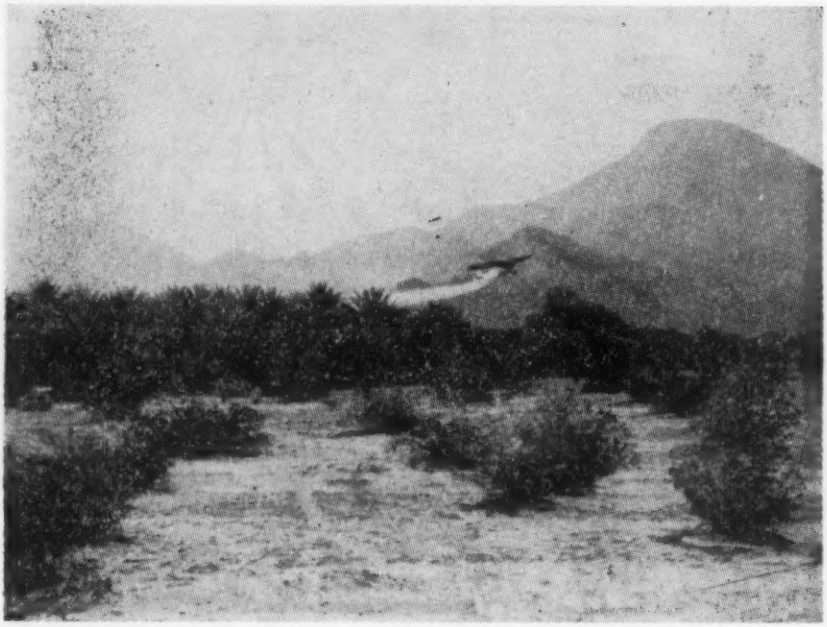
Many new establishments such as the sugar beet factory in the upper photo and the cotton gin in the lower photo have been constructed to process agricultural commodities grown with All-American Canal water.



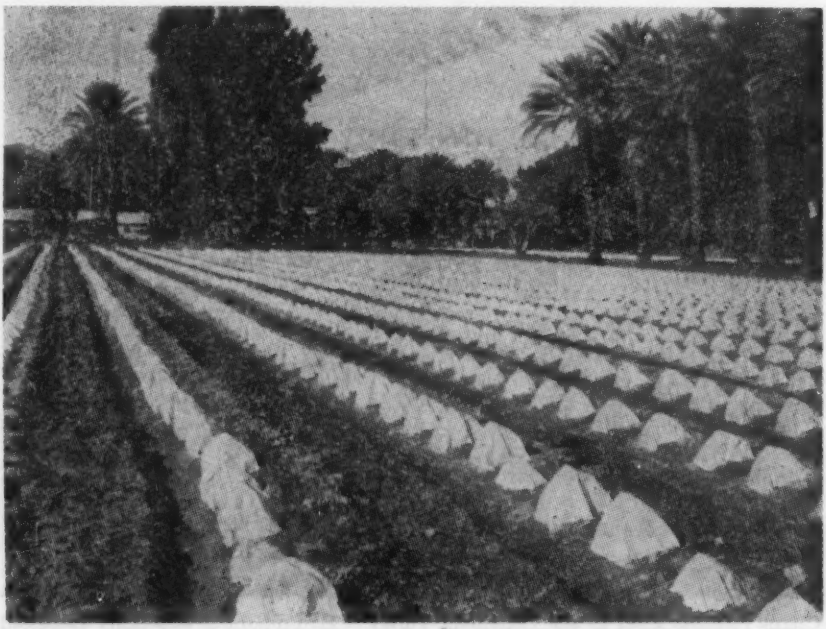
Packing melons requires much hand labor as well as especially designed packing machinery. In 1954 over 4,000 railroad carloads of melons were shipped from the Imperial Valley.



Top icing a car of melons prior to shipment to eastern markets. Ice manufacturing is an important industry supported primarily by agriculture.

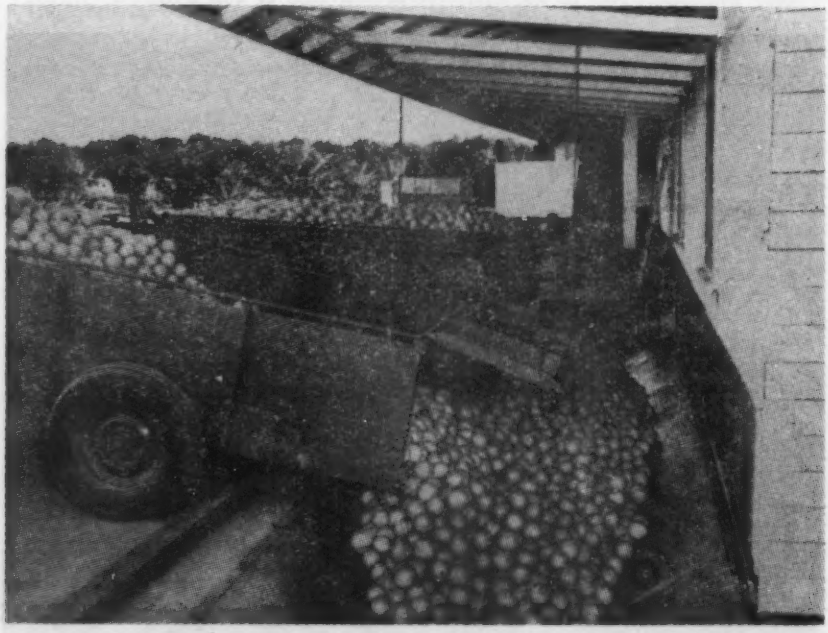


Plane dusting a date garden for insect control. Aircraft are playing an increasingly important role in the agricultural activities of this irrigated empire.



Protective caps are used by the thousands in the vegetable growing business Caps shown in the above photo are over young tomato plants.

Vegetable crops thrive in the warm desert sunshine during the winter.



Citrus packing shed in the Coachella Valley. Equipment is especially designed for bulk handling of fruit.

The high degree of mechanization on southwestern irrigated farms provides many new economic opportunities in the farm equipment and related industries.

New suburban residential developments are common throughout the Imperial and Coachella Valleys.

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